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The Only Weekly Mining Paper in the Union and Rhodesia.

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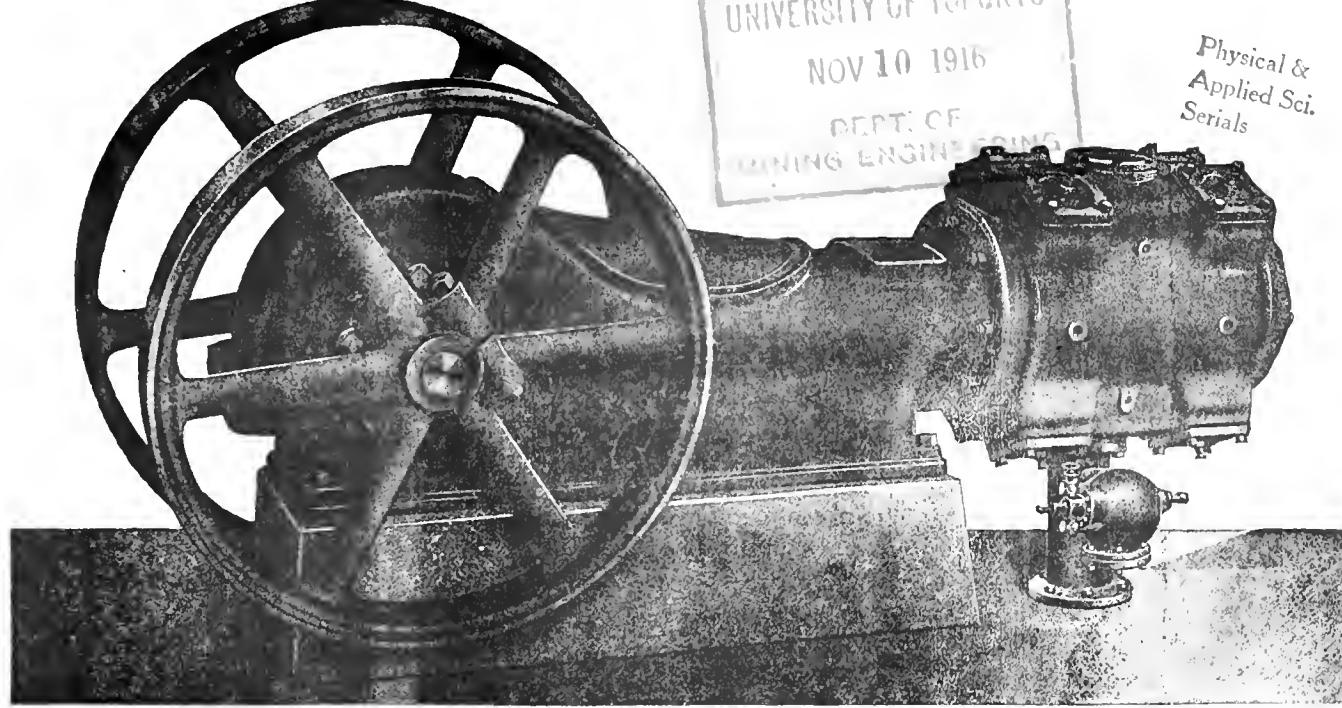
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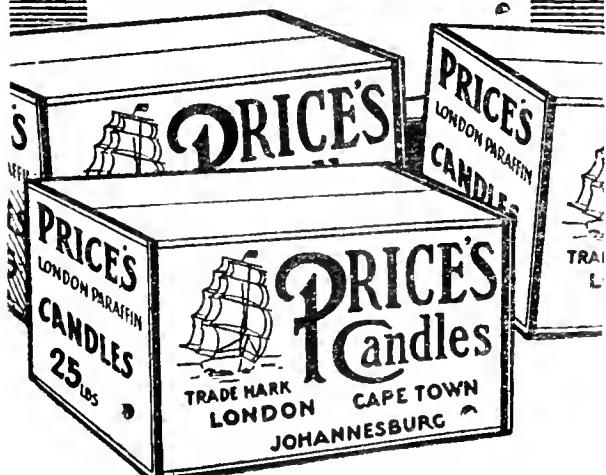
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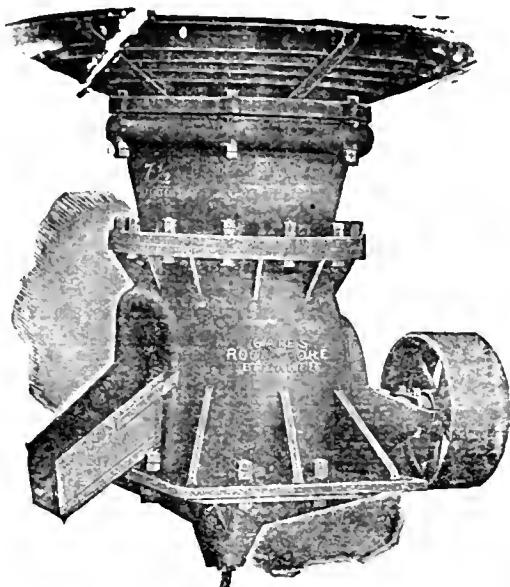
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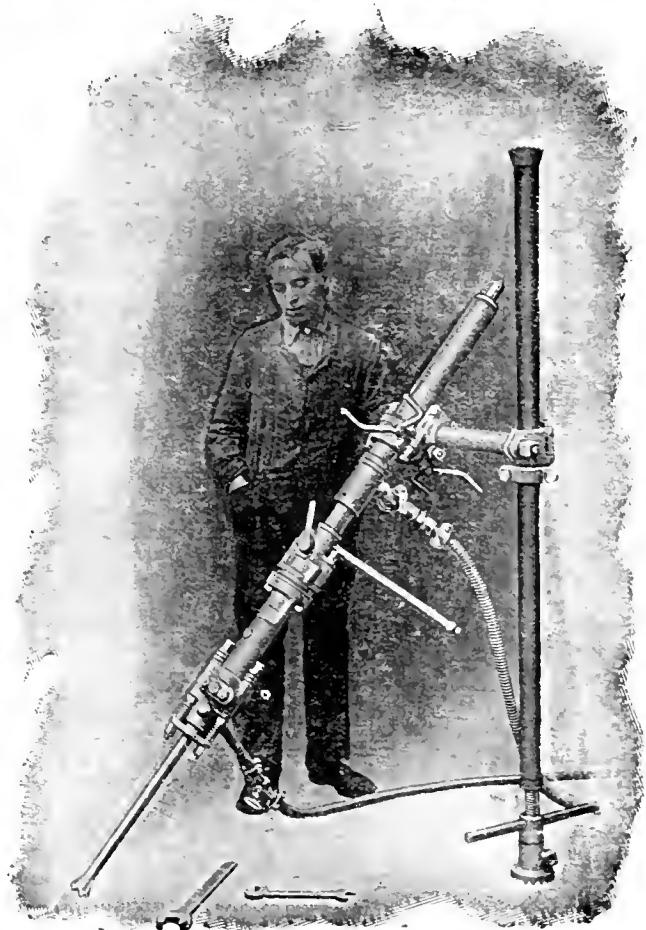
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Notes and News

The following cablegram was despatched to London on the 23rd inst. by the Nigel Company: "Board

The Nigel. of directors desirous of obtaining best advice have secured services Percy Cazalet, consulting engineer, Corner House, to report on the property; shall telegraph you recommendations for information of shareholders as soon as report received; publish." It will be remembered that after a series of regular, if moderate, dividends to June last year, the Nigel's crushings fell off to such an extent that the temporary closing down of the mill was considered. At the same time the technical advisers reported that the future of the mine depended upon the large shoot, lately exposed in the 11th drive east of No. 3 shaft. It was decided to continue milling a reduced tonnage of the higher grade ore, charging the development expenditure against revenue. The company has consequently been month by month reporting losses of varying extent. For a time the new shoot opened up favourably, but it was notified that the last three months' work has been unpayable, and unless a change takes place the financial position of the company will require consideration.

* * * *

It is notified for general information that, as from the 3rd

Rand Water Board. October, 1916, the Rand Water Board's headquarter offices will be situated on the 2nd floor, Central House, Commercial Exchange Building, Simmonds Street, Johannesburg. A private telephone exchange has been installed in the Board's new offices under the numbers 5436 and 5437, and these will take the place of the existing telephone numbers 1141 and 1570 on and after the date mentioned. It has been decided by the Board that, during the period from the 1st October, 1916, to the 31st March, 1917, the Board's headquarter offices shall be open from 8 a.m. to 4 p.m. on week days, excepting Saturday, when the hours shall be from 8 a.m. to 12 noon.

* * * *

From the Mines Department statistics we learn that some 2,460 ounces of gold, valued at £10,453,

Cold in Natal. were produced in the Province of Natal during the year 1915. Since then the yield appears to have fallen off to a notable degree, for during the month of August last only 24 ounces, valued at £102, were declared, and altogether the output has been quite spasmodic, no recovery having been declared at all for six months out of twelve. At the same time prospectors have been busy, and from the Vryheid district there comes the report of an extremely rich find during the last few weeks. How far subsequent exploration has confirmed this statement we have not yet been informed. The Cape Province continues to yield a few occasional ounces of the precious metal. The output during 1915 was 48 ounces, and in August last 5 ounces.

* * * *

The development figures for August go to show that development is being kept up to the mark

Transvaal. in the Transvaal, for which, owing to the **Mining Statistics.** preponderance of the local operations, may be read as the Witwatersrand. The number of rock drills, at 6,115 for the whole Transvaal, is a little higher than the average for the past eight months, but is nevertheless lower than last year. At the same time the tonnage of waste hoisted appears to be increasing to a considerable extent, for whereas the figures in January were 75,994 tons, they were 101,174 tons in February. It is interesting to note that while the Chamber of Mines returns show that the sorting percentage for August was 8·42, that of the Mines Department work out at 8·47. In any case it is clear that the percentage of sorting on the Rand tends to diminish rather than to increase.

The coal output of the Transvaal, Natal and the Orange Free State shows an all-round expansion this year. The coal sold last year at the mines in these Provinces was respectively 5,202,805 tons, 727,553 tons, and 2,304,116 tons. In August the sales were 528,679, 66,676, and 276,455 tons. The Cape output is comparatively negligible and shows a down grade movement. Pit mouth prices in the Transvaal in August averaged 4s. 7·08d., in Natal 7s. 2·53d., and in the Free State 5s. 4·46d. per ton, and taken over the past two years show an appreciable advance generally. The total August tonnage for all the Provinces was: Transvaal, 528,679; Cape, 3,908; Orange Free State, 66,676; and Natal, 276,455 tons; total, 875,718 tons, valued at £241,145 at the pit's mouth. The total figures for 1915 were 8,281,324 tons, valued at £2,142,479.

* * * *

During the month of August 745 tons of product averaging 50·11 per cent. of pure copper were produced in the Transvaal, and 999·370 tons averaging 45·28 per cent. of copper were obtained in the Cape. During the same period 246 tons of ore averaging 65·48 per cent. pure tin were produced in the Transvaal, no return being made from the Cape, whence about 40 tons of concentrates per annum are being shipped. The copper and tin outputs may be said to be steady, with an upward tendency.

* * * *

Industry and Science. The report of the Committee of the Privy Council for Scientific and Industrial Research for 1915-16 was issued in mail week. The Committee summarises the following conditions which will need to be secured if the

object for which the committee was established is to be attained: (1) Largely increased supply of competent researchers; (2) a hearty spirit of co-operation among all concerned—men of science, men of business, working men, professional and scientific societies, universities, and technical colleges, local authorities, and Government departments. "We have not yet learned," says the report, "how to make most of mediocre ability. There is as much place and need for plodding labour in scientific research as in other kinds of work. Responsibility for dealing with the grave situation which we anticipate rests with the Education Departments of the United Kingdom. As regards the second condition of success, progress in co-operative effort is undoubtedly being made. But there are specially strong reasons for more co-operation between various British firms in each industry and between industries and State in furtherance of research. If the general level of manufacture can be rapidly raised by co-operative effort in exchange of information between firms and in support of national trade institutes for research, as well as in improvement of conditions and efficiency of labour, this country will have gone far towards establishing its industrial prosperity on a firm basis. If it be supposed modern industry can be developed, or even maintained, by a process of detailed investigations and a series of particular inquiries, time, trouble and expense will be largely wasted."

* * * *

State Mining Commission. The Governor-General has appointed a Commission to enquire into and report upon the following matters: The advisability of State mining; the financing, organisation and control of State mines, if such mines are created; and any legislative steps required. The following gentlemen have been appointed members of the Commission: Messrs. Percival Ross Frames (Chairman), Tielmann Johannes de Villiers Roos M.L.A., John Taylor, Robert Harold Miller, Jacobus Lodewicus van Eyssen, with Mr. Arthur Pyrus Whittome as secretary.

* * * *

Stock Exchange Values. A slight improvement in the market value of Stock Exchange securities is shown by the representative table appearing in the "Bankers' Magazine." In July there was a net decline of 0·7 per cent., due mainly to the removal of the last of the minima, but this time a net gain of 0·2

per cent. is recorded. In Government funds and railway stocks certain declines—mostly fractional and none reaching 2 points—have occurred, but instances of substantial advances appear in industrial and speculative stocks. Miscellaneous mining shares are 7·8 per cent. up, and brewery stocks follow a close second with 7·7 per cent. South African mines have risen 4·9 per cent., waterworks 3·9 per cent., and shipping shares 3·2 per cent.

* * * *

Death has been busy among prominent Johannesburg pioneers in the past few days. A notable loss to

Obituary. the mining world is the passing of Mr. J. L. van der Merwe, formerly Mining Commissioner of Johannesburg. The late Mr. Van der Merwe had an eventful career, having filled the following positions under the Government of the late South African Republic: Mining Commissioner at Barberton, 1885 to 1893; Acting Special Landdrost of Barberton; Chairman of the Diggers' Committee, Barberton; Chairman of the Barberton Hospital Board; Mining Commissioner of Johannesburg, 1893 until the British occupation; Chairman of the Hospital Board; Chairman of the Government Commission Jameson Raid, 1895-96; member of the Government Commission to inquire into the causes of the dynamite explosion at Johannesburg on 19th February, 1896; member of the Dynamite Relief Committee; member of the Johannesburg Liquor Commission; President of the Witwatersrand Agricultural Society. During the War, 1899-1902, Mr. Van der Merwe saw active service from Magersfontein till the conclusion of peace under Generals Piet Cronje and De la Rey, and resumed his official duties in 1903, when he was appointed Deputy-Assistant Registrar of Mining Rights, Johannesburg, which he held until the position of Mining Commissioner of Johannesburg was reconstituted, and to which he was appointed and retained until February last, when he was seconded to assume the Chairmanship of the Miners' Phthisis Board. He took a deep and personal interest in phthisis work and remained a member of the Board under the new Act until his decease. The funeral last Saturday was attended by most of the leading people in the mining world of the Rand. Following close on the news of Mr. Van der Merwe's death came that of Mr. Smale Adams, the able and indefatigable Secretary of the Chamber of Commerce, and of Sir Thomas Price, the late General Manager of the Railways. The whole community is the poorer by the loss of three such distinguished pioneers.

* * * *

Judgment was given on Thursday by Mr. Justice Ward in what has become known as "The Geduld Pegging Case," in which Edward Russell and sixty-three others called

upon the Mining Commissioner, under a rule nisi, to show cause why he should not be ordered to issue to the applicants licences to peg certain claims on the farm Geduld, or, in the alternative, why he should not be ordered to allow the applicants to prospect and mine on that area. Mr. Justice Ward, in discharging the rule, said, *inter alia*, it was common cause that it might be fairly deduced from the available facts that the area contained gold in payable quantities. Mr. Kotze, the Mining Engineer, said that he had held this opinion since 1913, and he believed that it had been so held by most mining engineers who had considered the matter. On the 22nd of August, 1916, the applicants applied to the respondent for a licence to peg fifty claims in the said area. This application was refused on the ground that the Mining Commissioner had no power in law to grant such permission. The applicant alleged that he called the attention of the Mining Commissioner to a case where the Mining Commissioner of Heidelberg had, under Section 72, sub-section 4 of Act 35 of 1908, granted licences to other applicants over another area. The circumstances were not quite the same; but, in any event, the matter seemed to be irrelevant and need not be further referred to. The contention of the applicant was that he was entitled to prospect and mine on this area under Section 72, Sub-section 4 of the Gold Law. Section 72 of the law provided that the Mining Commissioner might permit the use

of open proclaimed ground (which was defined as proclaimed ground not held under mining title) for gardens and so forth. After a lengthy review of the law, the Judge gave his decision in favour of the defendant, *i.e.*, the Government.

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Statistics in regard to the capital invested in mining as at the 31st of December, 1915, are published

Capital in Mining. with the official mining statistics this month. The issued capital of Witwatersrand gold mines was £57,840,616; debentures issued £12,687,763; debentures outstanding, £7,627,158; and the book value of mining property, £34,531,551. The dividends declared last year amounted to £7,523,818. The capital employed in gold mining in other districts of the Transvaal was £6,316,416, and dividends declared amounted to £210,283. In the Cape the capital invested in gold mining amounted to £132,287, in the Free State to £240,651, in Natal to £35,000, none of which earned a dividend last year. The amount of capital invested in diamond mining in the Transvaal was £297,293, in the Cape £5,748,198, and in the Free State £1,557,793. No dividend was declared last year. The issued capital in the Transvaal coal mines was £3,487,914, which earned dividends totalling £350,449; in the Cape the capital was £252,492, and in the Free State £1,102,680, on which the dividends amounted to £2,763; and in Natal £2,664,115, dividends from which came to £44,710. The capital in base mineral mines in the Transvaal amounted to £1,590,890, and dividends £22,500. In the Cape the capital invested in base mineral propositions was £1,435,713, and last year's dividends totalled £43,582.

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A very unsatisfactory showing is made by the accounts of the Rhodesia Railways, Ltd., for the year

Rhodesia to September 30, 1915, owing principally to the marked falling off in imported traffic of all descriptions, to which the general scarcity of sea freight, consequent on the war, largely contributed. The report of the Rhodesia Railways Trust for the twelve months to March 31 last mentions that the revenue of the railways for the year to September 30, 1915, before providing for debenture interest and other fixed charges, was £639,737, as compared with £862,746 for the previous year. The working of the Rhodesia Railways showed a profit of £58,175, as against £225,512 for the previous year; and that of the Mashonaland Railway Company showed a loss of £97,035, as against a loss for the year ended September 30, 1914, of £14,032, and the debit balance at September 30, 1915, amounted to £1,422,596. Taking the two companies together, the working result was a loss of £38,860, and there was at September 30 last an accumulated loss on working of £1,244,666. The profit of the Rhodesia Railways Trust amounts to £2,547, and this with £107,230 brought in is to be carried forward.

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The *Financial News*, in its "Diamond Special" of mail week, says:—The diamond market continues in a very flourishing condition, and we are informed that the Jagersfontein

The Diamond Market. diamonds marketed by the Diamond Syndicate during the week under review found ready buyers at ever-increasing rates. The next shipment to be shown by the Diamond Syndicate will be Bultfontein, on or about September 7, for which the demand for sights is absolutely phenomenal, small diamonds being in such demand, of which these Bultfontein diamonds are mostly composed. Further increased business in rough stones and brilliants is anticipated during September and October, and altogether the prospects of the trade are very rosy. The shares of the various companies should greatly benefit by the good business being transacted, and if production, now that the companies are slowly restarting, is kept within businesslike limits, great prosperity should be in store for holders of diamond shares. The July importations into America were: Brilliants, 1,871,802 dollars; rough, 525,589 dollars; total, 2,397,391 dollars, against 1,605,769 dollars in July, 1915, thus showing a very substantial increase.

TOPICS OF THE WEEK.

THE SUPPLY OF WHITE MINERS.

JUDGING from various statements that have been made quite recently by some of the leaders of the gold mining industry, one may safely come to the conclusion that the question of the supply of experienced white miners is becoming more acute than ever. To some extent the drain upon the mines which has resulted from the war has accentuated the difficulty of the problem, but generally speaking it may rather be said to have emphasised a situation that was shaping itself before the war commenced. That this is the case is to be gathered, for instance, from the last annual report of the manager of the Simmer and Jack. He says: "The unsatisfactory position with regard to the supply of white labour, referred to in the report for the previous year, has in no way improved. If this were to a great extent due to the absence of men on active service, the outlook for the future would be more hopeful. The cause of this unsatisfactory state of affairs is the lack of co-ordination and system in the training of learners on the various mines, and the facility with which they are able to leave and obtain employment from mine to mine." In like manner the inexperience and inefficiency of the average white miner is commented upon at greater or less length by nearly all the inspectors of the Mines Department. None of these, however, seem to have got at the root of the trouble. The altitude of the Rand has served very well in the past to explain many things that were not susceptible of explanation in an ordinary simple way, but nowadays the war is a comprehensive and efficient sort of substitute, and it seems to be looked upon very largely as a cause of the present unsatisfactory condition of underground labour. Mr. O. P. Powell, the manager of the Simmer and Jack, as we have shown, is not altogether satisfied with this particular illustration of cause and effect. Neither is Mr. Malcolm Fergusson, who, as Chairman of the Board of Control of the Government Miners' Training School, has been able to concentrate his vision upon some aspects of the problem that seem to have escaped the notice of the ordinary observer. Speaking of the continued want of success of this school, Mr. Fergusson draws attention to the learner system which obtains on the mines of the Rand, and which acts as a handicap upon the efforts of those who are trying to produce competent and experienced miners by the approved process of giving them an adequate training. "All the mines continue to sign on a large number of learners annually," he remarks. "In the great majority of cases the one desire is to make of these learners specialists in the art of breaking ground. The big cheque is held out to these learners as an inducement for them to qualify in the shortest possible time as rock breakers. . . . Very few of this medley of learners ever become good and efficient miners; the vast majority of them develop only to the standard of mediocre workmen, and once they fall into the ranks of mine employees they drift about from mine to mine and eke out an existence." This simple but perfectly accurate sketch of the state of things that is largely prevalent even upon some of the most important mines of the Rand requires no elaboration. To put the thing into a nutshell; the work of the Miners' Training School is being hindered, if not jeopardised, by the system which encourages the open-handed bestowal of contracts and other responsible jobs upon apprentices who are "passing rich" on a daily earning of from ten to twelve shillings, and correspondingly inefficient. Statistics with regard to this phase of mine labour suffer from the usual defects common to numerical statement. The mining inspector of the Germiston district, Mr. C. E. Hutton, has gone a little further than some of the others with the matter, and has found out that the 1,394 certified gangers employed in his district have been holders of blasting certificates, on the average, for 5·4 years, to which must be added the minimum probationary period of eight months. "From the foregoing it can be said that the average underground experience of gangers is more than six years, which does not quite support the popular idea that the white responsible workers in the mines are very inexperienced." Finding

statistics and personal experience somewhat at variance in this enquiry, Mr. Hutton went a little more into detail, with the result that out of the 1,394 certificated gangers above referred to, no less than about 36 per cent. could be classed as not fulfilling an assumed time condition. The condition was that before a miner could be rated as really experienced he should have worked as a responsible ganger for a period of over three years. It says much for the mining district of Germiston that it has got along as well as it has done, with nearly 40 per cent. of its blasting certificates in such obviously unsophisticated hands. So far we have only been able to draw attention to some outstanding facts. A good deal more might easily be written about the policies and circumstances that have given rise to the existing state of things, if one had time or opportunity—about the absence of anything on the Rand that might attract the experienced miner, and the mistaken craze for cheap white labour that is partly at the bottom of this youthful contractor business. It is a question that demands a great deal more consideration than it has yet been given. As Mr. Wallers, however, took occasion to say, in his presidential speech at the last meeting of the Chamber of Mines, the problem of supplying capable miners is being carefully thought out, and there is little doubt that every aspect of this very comprehensive question will receive attention in conjunction with the special problem of the Miners' Training School. The establishment of a systematic and properly co-ordinated method of training throughout the mines of the Rand, as was foreshadowed by the President of the Chamber, is a step that should go a very long way in the desired direction.

HEALTH AND THE PAY OF THE MINER.

QUESTIONS relating to the health and pay of the miner bulked largest in the quarterly review of industrial conditions by the President of the Chamber of Mines this week. A full report of the speech made by Mr. E. A. Wallers on the occasion will be found in another part of this issue, and his remarks on the all-important subject of mine learners are given separate treatment. The protracted negotiations that have been going on during the year in regard to the miners' working hours and rates of pay naturally called for explanation by the President of the Chamber, and Mr. Wallers dealt very fully with them. He pointed out that agreements had been completed recently in regard to the conditions generally of employment of certificated winding engine drivers and the mechanics on the mines. Both of these agreements involved much discussion between the unions in question and the employers, and Mr. Wallers added, "I feel you will agree that the industry has met the requests of the men in a manner that is certainly fair-minded, and, indeed, generous in some directions. I feel sure, however, that we shall have no reason to regret in the future any of the concessions that we have made." The principle of meeting the duly accredited representatives of the men's unions which was adopted by the Chamber some 18 months ago certainly facilitates the presentation to the mining industry of the employees' requests, and involves a great deal of work in the shape of industrial conferences. The importance of the work, however, cannot be over-estimated, and the readiness evinced by the Chamber to discuss any reasonable grievances put forward by the representatives of the employees must have the best of results on the relationship between the employer and employee, and the confidence and good feeling thus engendered should certainly, as Mr. Wallers hopes, prove a most valuable asset to the mining industry. A graceful tribute to all concerned in these negotiations on behalf of the Chamber was paid by Mr. H. Newhouse. In dealing with the new periodical medical examination of miners, Mr. Wallers stated: "It would be well, I think, to add here a word or two as to the reason underlying this periodical medical examination, because there would appear to be a little misapprehension in the minds of the men themselves. It is solely for the purpose

of eliminating from underground work a man suffering from tuberculosis of the lungs, and no other individual than that will be prevented from continuing his occupation. No official statement has yet been issued by the Bureau of the results of its work to date, but I am at liberty to acquaint you with one extremely gratifying feature of which I know that has resulted from the periodical medical examination of all European mine employees up to the present. It is this that, from the evidence so far obtained, happily very few men need fear they will be prevented from continuing their present occupation; in other words, the examination of the men at present working, as far as it has gone, discloses the fact that extremely few of them are in a state of health necessitating their giving up their present work. That evidence you will agree is exceedingly satisfactory, primarily for the men concerned, and secondly for ourselves." Another interesting point is the extension of the Chamber's war bonus scheme which had been adopted as a natural sequence of the further increase in cost of living that has taken place recently. The total increase is now calculated at 13 per cent. The scale of bonus adopted is in accordance with the view of the Chamber, when this matter was originally discussed rather more than 12 months ago, namely, that the less highly paid employees, who have a smaller margin of wages out of which to meet the increase in the cost of living, should receive the largest bonus. After a certain figure has been reached (laid down at £27 10s. per month) the employee must be considered, in view of the margin between wages and cost of living that exists here in normal times, as able and willing to bear himself the increase in the cost that has taken place. In considering the question of a war bonus to employees of the gold mines, it must always be remembered that it does not in any way correspond to the war bonuses granted in various trades in the United Kingdom. As the President made clear, the latter are to a very large extent the means by which the employees participate in the extra war profits of their employers. In the gold mining industry these extra profits cannot exist, and the additional heavy costs of production which are being borne by the mining industry cannot be passed on to the consumer. Mr. Wallers mentioned that as regards the new Miners' Phthisis Act the necessary organisations, viz., the Miners' Phthisis Board and the Miners' Phthisis Medical Bureau, have been established by Government, and the mines are doing everything possible to facilitate the work. In view of the fact that men suffering from silicosis who have withdrawn from underground work have, after a period of abstention from that work, happily become quite fit for other employment, Mr. Wallers was able to announce that the employers had been considering the details for the establishment of a Bureau under the aegis of the Association of Mine Managers for the employment of silicotic men on the surface of the gold mines in suitable branches of the work. They had now perfected arrangements and the Bureau will be in operation at the beginning of October. The President felt sure that it will in course of time be responsible for the placing of a large number of silicotic men in suitable surface employment. Turning to the dust question, Mr. Wallers showed that the increased interest in the question of the elimination of dust from mine air, brought about largely through the dust sampling work undertaken by the Chamber, continues to be maintained, and, as mentioned in the report of the Executive Committee, each mine has appointed a dust sampler of its own, who spends the major portion of his time in taking dust samples on the mine for analysis and record in the Chamber's laboratory. "The lectures for mine dust samplers and to stimulate interest in the subject generally that have been arranged by the Chamber are being well attended, and will, I am sure, prove very valuable. Finally, I think, gentlemen, that the Chamber's Standing Committee on Dust Sampling calls for our congratulations and our keen appreciation of the manner in which it has fostered interest in the elimination of dust amongst mine officials, as well as the new ideas that it has continued to bring forward to that end." There were many other important points in Mr. Wallers' address, but the fact that so large a part of it was concerned with improving the lot of the mine worker is a welcome sign of the times.

THE ANNUAL REPORT OF THE G.M.E.

Points from the Latest Official Review of the Mining Industry.

THE annual report of the Government Mining Engineer for 1915, issued last week, shows that the total number of persons in the service of mines and allied concerns and the number of individual diggers engaged in mining operations within the Union of South Africa was for the month of December, 1915, as follows: Gold mining industry, 246,833, or 82·4 per cent.; diamond mining industry, 11,476, or 3·8 per cent.; coal mining industry, 25,869, or 8·6 per cent.; base mineral industry, 9,131, or 3·1 per cent.; miscellaneous, 6,364, or 2·1 per cent. The increase compared with twelve months previously of 55,412 persons is due principally to the superabundant native labour supply of the Witwatersrand gold mines. For the first time on record in the history of that goldfield there has been more native labour than was required. The Jupiter G.M. Company, Ltd., restarted working in June and crushing in September, and the Golden Hill Mine, Ltd., started in January, crushed from June till November, and then ceased operations. The New Rietfontein Estate G.M. Company, Ltd., ceased crushing in August. Witwatersrand gold mines employed 96·0 per cent. of the total number of whites and 94·4 per cent. of the total number of coloured employed in gold mines in the Transvaal. £15,879,675 were expended by mines and allied concerns within the Union for the year 1915. The expenditure for 1914 was £16,518,278. Of this amount the gold mining industry accounts for £13,655,373, or 86·0 per cent., against £12,595,563 for 1914; diamond mining industry accounts for £352,336, or 2·2 per cent., against £2,058,364 for 1914; coal mining industry accounts for £1,001,315, or 6·3 per cent., against £991,822 for 1914; base mineral mining industry accounts for £398,071, or 2·5 per cent., against £369,180 for 1914; miscellaneous, £472,580, or 3·0 per cent., against £503,349 for 1914.

EXPENDITURE INVOLVED.

During the year under review machinery and stores of the value of £12,082,371 were consumed by the mining industry, a decrease of £142,164 on 1914. Of this amount the gold mining industry accounts for £10,935,383, or 90·5 per cent., against £10,277,087 for 1914; the diamond mining industry accounts for £139,521, or 1·2 per cent., against £969,325 for 1914; the coal mining industry accounts for £617,819, or 5·1 per cent., against £643,158 for 1914; the base mineral industry accounts for £389,648, or 3·2 per cent., against £331,965 for 1914. An amount of about £6,240,000 or more than half of the amount expended by mines on stores and machinery, is estimated to represent expenditure on South African products. The items which it is thought may reasonably be deemed to be derived from local produce, either wholly or to a great extent, are indicated hereunder.

MINERAL OUTPUT.

The year's output of gold, diamonds, coal, copper and tin was valued at £45,531,009, gold being responsible for £38,639,095, representing 39·5 per cent. of the world's production, which was estimated at £97,852,000. The total production of gold from the Union of South Africa since 1868, when gold was first discovered, amounts to approximately £475,472,000, and was practically all won in the Transvaal. The chief differences in the value of the output of 1915 as compared with 1914 are as under:—Increases: Gold, £2,974,865; copper, £349,959; tin, £20,029; asbestos, £15,182; salt, £14,411; soda, £13,753. Decreases: Diamonds, £5,087,384; coal, £116,417; miscellaneous, £35,147. The gold output shows an increase on 1914, but the output for that year was considerably below 1913. The 1915 output was some £52,000 less than that for 1912, in which year the output reached the highest point since Union. The increase in the copper output is chiefly due to enhanced prices, and the same remark applies to tin. With regard to asbestos, a number of new producers have appeared, but it is doubtful whether the progress indicated will be main-

tained. The Transvaal and Orange Free State Provinces are together responsible for the increase in the salt output, the Cape output being practically the same. The South African Alkali, Ltd., which company commenced operations towards the end of 1914, maintained an improved output of soda during 1915. The decrease in the value of the output of diamonds is, of course, due chiefly to the mines having remained closed down. Alluvial diamonds, although actually showing a decrease, had considerably recovered towards the end of 1915, and indications of continued improvement are not wanting.

SAFETY FIRST.

The accident death-rate for Witwatersrand gold mines is 3·17 per 1,000, showing a slight improvement on the figures for the previous year, which constituted a record low rate since 1903. This result is very satisfactory, especially in view of the disadvantages under which work has been carried on during the war period, many of the skilled supervisors and miners being engaged in the service of their country. The various managements have continued to exercise closer supervision in regard to the prevention of accidents, and the Safety First Committee of the Rand Mutual Assurance Company, Ltd., of which mention was made in the last annual report of this Department, has continued its excellent services in the above direction. It is largely due to these efforts that the further improvement in the accident death-rate has been attained. Attention has frequently been drawn in these reports to the influence on the accident rate of the personality of the manager and his heads of departments. It may here again be pointed out that these officials set the fashion for the mine. If they are reckless or careless, the spirit of recklessness will prevail throughout the mine. If they are careful and vigilant, the rank and file of miners and workmen become careful and vigilant, and accidents and disease are rare. This point is exemplified in the fact that where workings are recognised as being dangerous very few accidents ever occur, because care and vigilance in that case are a necessary adjunct to the working of such places. If every mine official would start with the axiom that every place in a mine is a site of potential danger, he would then begin to look for the possible sources of such and anticipate a large number of the accidents which still occur. This principle appears to have been recognised to some extent by the mines, as there is a decided tendency to reduce the areas over which shift bosses have supervision. These officials consequently have more time to attend to the different working places in their sections.

The Servian Mines.

The German-Bulgarian Union, of Dresden, has published the results of Bulgarian mineral researches carried out in the eastern part of old Serbia. According to these researches there are extensive coal basins between the Mava and the Peck, to the south-east of Porareva. The Dobra mine has a capacity of about 25,000 tons per year. On the Miroteh mountain, to the south-east of Tetkia, there is a coal bed 30 km. (18·7 miles) in length. At Zajetchar, a colliery which has been working for the last 25 years and is connected by rail with Radujevac, on the Danube, supplies from 30,000 to 40,000 tons per year. The Malakaon Reka bed is given a length of 3 km. (1·8 miles) and an estimated capacity of five million tons. Sonich, located at a distance of 22 km. (13·7 miles) from the Belgrade-Sofia railway line, can yield a large coal output. The coal basin at Alexinats is given a length of 6 km. (3·7 miles). Coal is also found at Rtani, near Knajevats and in the Morava Valley, at Tzidilie. The copper mines are the Bor, the Kuka Dulcan and the Maidan Pek mines; copper is also found at Studina, to the south of Niseh. The iron-bearing districts are in the Kapaenik range.—Engineering.

THE CAPE ASBESTOS INDUSTRY.

The Deposits in Kuruman, Hay and Prieska Districts—Largest Asbestos-Bearing Area in the World.

THE Blue Book containing the annual report of the Government Mining Engineer, just issued, comprises the following interesting memorandum on the asbestos industry in the Cape Province, by Mr. G. E. B. Froid, Deputy-Inspector of Mines, Bloemfontein:—Opportunity has been found during the year to pay a couple of visits to the asbestos-producing districts of the Cape. The time at disposal was short, and the extent of country to be covered enormous, with the result that only a limited number of representative properties could be roughly inspected. However, any information throwing light upon our own share and probable future interest in an industry of such rapidly increasing importance as that of asbestos should be of particular interest. At the same time, although we have had a South African production for well over twenty years, singularly little attention has been attracted to it hitherto, and certainly very little information regarding it has reached either public or Government. In these circumstances, one may find some warrant for the following attempt to summarise the rough impressions formed from inspections necessarily hurried and conversations most often fortuitous.

EXTENSION OF BLUE ASBESTOS.

Blue asbestos is found in the lower Griquatown beds, and this series, for present purposes, may be taken as identical with the range of hills known as the Asbestos Mountains and the continuation north of these in the Kuruman-Honingvlei range. Mineralogically, the mineral is asbestos-form crocidolite. In South Africa the term crocidolite has, however, been commonly applied to the chatoyant hard varieties used in jewellery and for ornamental purposes, and also known as "tiger's-eye" and "cat's-eye," while the asbestos-form mineral is termed asbestos. In conformity with this usage, and in order to avoid confusion, the term asbestos is also applied throughout in this memorandum to the latter variety only. The mineral is said to have been discovered thirty miles south of Prieska, and it has certainly been opened up as far north as the border of the Bechuanaland Protectorate. Taking the rather sinuous course of the above hills into account, this would indicate a lineal extension of well over 300 miles. Throughout that distance, the asbestos deposits are found to occur in greater or less abundance. There may be small stretches in which it has not yet been opened up, or in which it has not yet afforded satisfactory prospects of payability, but, so far as is known, there is no portion of these hills on this line in which it can be said positively that it will not be found. As regards the surface extension laterally of the lower Griquatown beds and their contained asbestos deposits, it is more difficult to speak. Starting from Tsenin, which may be taken as nearly the furthest point north that conditions are likely to permit of the profitable exploitation of the mineral, to a point forty miles south of there, the average width of the exposed portion is about six miles, but a little south of this again we have rich occurrences of asbestos nearly twenty miles apart on an east and west line. This considerable exposure lasts to Warrendale, about ten miles south-west of Daniel's Kuil, or about eighty miles south-east of Tsenin. From Warrendale on to Griquatown, another forty-five miles, the surface extension of the series between the overlying middle Griquatown and the underlying Campbell Rand beds contracts to an average of only about four miles. Beyond Griquatown and on to Prieska, as appears from the maps of the Cape Geological Survey, the exposures extend laterally beyond the limits that it would be safe to include meantime within the asbestos horizon. Looking to the extension that has been indicated above, we have in the three districts of Kuruman, Hay and Prieska much the largest asbestos-bearing area in the world. Even if we were to allow for considerable failure in continuity from north to south, or across

the series, the fact would still remain. For the most part of their course, the eastern escarpment of the Asbestos-Kuruman range abuts rather sharply on the Campbell Rand series of the Kaap plateau to the east. Towards the west the slopes are more gentle. Most of the producing properties are found towards the eastern side of the range, though it does not follow that there is any permissible inference from this as to the distribution of the asbestos. Generally speaking, the rocks are best exposed towards the east, and this may have favoured prospecting, or it may have been that difficulties arising from scarcity of water or other causes, have not proved so insuperable on this side. At any rate, we have as good asbestos at Khosis, twenty miles to the west, as anywhere in the series, whilst from what I have myself seen, the best asbestos may as well be in the third or fourth hill back as in that forming the eastern escarpment.

PRINCIPAL OCCURRENCES.

The richest occurrences so far opened up to any considerable extent are those at Koegas, right on the Orange River. From Koegas to the Bechuanaland border, 130 miles to the north-east, we have only occasional properties working, but, according to the testimony of Dr. Rogers, there is scarcely a farm on this line throughout the Hay district on which asbestos-form crocidolite, or one of the series of products of oxidation and silicification derived from it, is not known to exist. From the Bechuanaland boundary on to Kuruman, we have a practical succession of asbestos properties, and even from the latter on to Tsenin there is very little ground which it has not been thought worth while to take up either on lease or prospecting title. It remains to be pointed out that whilst work has been proceeding quietly at Koegas for 20 years or more, the development of the Kuruman field is a mere matter of yesterday.

PROSPECTING.

All the prospecting that has been done so far has been simply of the nature of examination of the exposed strata appearing on the hill sides. As the formation is very nearly horizontal, the same strata will often appear on successive hills, and thus one discovery will lead to another. So far as I have heard, it is only at Khosis that the mineral has been found elsewhere than in the hills, and there, as I understand, only to a small extent. When one considers the limitation of this manner of prospecting in conjunction with the enormous area of the known asbestos-bearing formation, it will be recognised how great are the possibilities for future discoveries, and that the mere fringe of the deposits has as yet been investigated.

MINING METHODS.

The only mines on which we have considerable reserves actually developed and in sight are those of the Cape Asbestos Company at Koegas and Westerberg. Those are mines developed underground on normal lines, as also are the workings at Naauwpoort and Elandsfontein in the Hay district. At Wonderwerk, in the Kuruman district, a good start has been made with tunnelling and stoping underground, and the system of working has approved itself. At Bretyb, in the same district, some work has also been done on similar lines, though only, so far, in a rather tentative and experimental way. These are the only properties known to the writer on which any underground work worth speaking of has been done, but there may be others, and at any rate quite enough has been done to show both that the seams maintain their value underground and that they may be profitably worked. Elsewhere the recovery is obtained from surface quarrying, but undoubtedly the seams that have been discovered and worked at surface to more or less profit on a large number of properties indicate supplies that will generally prove to be available for profitable extraction by underground methods later.

PROBABLE RESERVES.

Looking alike at the properties already worked profitably by underground methods, those on which surface work has shown that the seams are likely to continue payable underground, and those on which further supplies are still available by cheap surface mining, there is a supply of asbestos assured that is more than adequate to meet any expansion of the market that can reasonably be anticipated for many years to come. In the meantime, fresh discoveries and developments may be relied upon to ensure continuity of supply for a further indefinite period.

SILICIFIED FORMS.

Whilst it is the intention to adhere as closely as possible to the remarks that follow to a purely industrial aspect, which must concern itself almost entirely with the asbestos-form variety of crocidolite, a passing mention may be permitted of the silicified forms which are found in great abundance and considerable variety throughout the field. These are undoubtedly the result of the oxidation of all, or practically all, the ferrous iron, and all the soda magnesia, etc., contained in the original forms and their replacement by silica. Various analyses shows the final proportion of silica to exceed 98½ per cent. In its valuable form, known as "cat's-eye" or "tiger-eye," the distribution is comparatively limited—little, in fact, being found, according to my information, away from the farm Naauwpoort, in the Hay district. However, on the latter farm, there is much more available than would suffice to flood the world's market at any time, were it desired to do so. The exclusive application of the term crocidolite, which belongs to amphibole asbestos, to the silicified variety is mineralogically of course a mistake.

THE CAPE ASBESTOS COMPANY, LTD.

The history of the asbestos industry in the Cape has been, until quite recently, practically that of the Cape Asbestos Company, and that corporation still controls the great bulk of the production, though a larger proportion of the output appears to be gradually reaching the market from independent sources. The above company was formed as far back as 1893, and since then has put the Cape industry generally under an irredeemable obligation by the fight it has maintained to gain for blue asbestos the due recognition to which it is entitled in face of formidable opposition. The position ultimately forced upon the company by the opposition—which came from the chrysotile or white asbestos people—was that it was obliged to mill and manufacture its product itself. This it accordingly set itself to do, and as the result of this policy the company has now its own factories, not only in England, but also at Turin and Hamburg. The most important development, however, has been the formation of a sister company in Paris—the Compagnie Francaise de l'Amiante du Cap—to take over the goodwill and trading rights in France with certain options as to shares and as to the supply of raw material on fixed terms. At the present time the company, in addition to handling perhaps two-thirds of the whole local production—partly the output from its own mines and partly from contractors working outside properties—is also much the largest European manufacturer of blue asbestos goods.

(To be continued.)

Ryan Nigel G.M. Co.

The annual general meeting of the Ryan Nigel Gold Mining and Estate Company, Ltd., was held in the board room, Trust Buildings, on September 20, Mr. B. T. Bourke presiding. Out of a total of 115,000 shares 52,540 were represented personally or by proxy. In moving the adoption of the directors' report and balance sheet, Mr. Bourke said that it was the policy of the company to endeavour to purchase certain farms adjoining the company's farm, Tweefontein, in the Pretoria district. It was also the intention of the board to endeavour to obtain options on one or two other farms in the Pretoria district. The report and balance sheet were adopted. Messrs. B. T. Bourke, C. H. Dawes, B. Koenigsberg and Raymond des Clayes were re-elected directors, and Messrs. Eckhart Beckmann and Alex. Aiken and Carter were re-elected auditors.

Vaal River Scheme.

Towards the end of the month the chairman of the Works Committee of the Rand Water Board and the chief engineer of the Board visited the Swaziland Tin Mines for the purpose of inspecting and studying the methods adopted there for removing earth and gravel by means of hydraulic power. From the inspection made of the tin mines and the particulars supplied by the officials of the Tin Mining Company, the chief engineer is confirmed in the opinion previously held by him that this method of excavation could be very usefully and economically applied at the barrage site, especially on the Orange River bank of the river. In his report dealing with this subject he states:—The all-round price allowed for removing earth and sand in my estimate of the 25th May was 9d. per cubic yard, or a total sum of £8,325 for 220,000 cubic yards. By hydraulicing the cost will not exceed 4d. per cubic yard, including loss on sale of plant, so, apart from the fact that the excavation can be carried out in a much shorter time, there will be a saving of at least £4,000 by adopting the hydraulic method. The class of material to be removed at the barrage site will, in my opinion, be somewhat easier to sluice than that at the tin mines, so the price will, in all probability, be under 4d. per cubic yard. The water for hydraulicing will be obtained from the Vaal River and the flood water will carry the soil away.

Explosives and Glycerine.

Nitro-glycerine and nitric acid are common to the manufacture of both blasting explosives and war propellants; in fact, all propellants classed as cordite, T.N.T., melinite, etc., used in this great war are manufactured from bodies such as cotton, glycerine and coal tar products, by treating them with nitric acid. As these notes are principally concerned with high explosives, it may be as well to mention that glycerine forms the base of the present-day explosives used in the mining fields of Africa. Glycerine is a by-product of the manufacture of soap and, at one time, was allowed to run waste down the gutters. With the invention of high explosives its value was soon realised, and to-day it commands a very high price indeed. One of the changes brought about by this war is that, whereas in the past the supply of glycerine was dependent on the quantity of soap produced, soap factories are being erected to-day with the express object of producing glycerine, soap forming the by-product. South Africa is fortunate in having three high explosives factories, but unfortunate in the fact that raw materials for the manufacture of nitric and sulphuric acids, collodion cotton and nitro-glycerine have practically all to be imported. It will readily be realised that the demand for propellants on the part of the Allies has been colossal and is becoming increasingly so, with the inevitable result that the manufacture of blasting compounds has been conducted under almost insuperable difficulties. Early in the history of the war the Imperial authorities set about husbanding their resources, and instructions were issued to all explosives manufacturers to seek the co-operation of the mines by getting them to use explosives having less nitro-glycerine contents. The Imperial authorities have all along very fully recognised the necessity for keeping the mines of South Africa going, but their first consideration is to protect the position of the men in the trenches by affording them a plentiful supply of shells. The explosives manufacturers of South Africa promptly met the position and showed their ingenuity and resource by economising greatly in glycerine and in being able at the same time to place on the market explosives containing less nitro-glycerine contents, but which in many cases are equally as effective as the standard explosives—blasting gelatine and gelignite. As these "substitute" explosives (as they are termed) contain less nitro-glycerine, they are less costly to manufacture, with the result that they can be sold more cheaply. A mine, therefore, which uses one of these substitutes in place of the standard explosives will not only reduce its working costs but will also assist in the general scheme of reducing, during the war the commercial consumption of nitro-glycerine to the lowest possible limit, as desired by the Imperial Munitions Minister. An appeal along these lines was made to the mines of Rhodesia over a year ago, and as a result such substitute explosives are now in very general use throughout the territory.—"Report of the Rhodesian Munitions and Developments Committee."

THE GOVERNMENT MINERS' TRAINING SCHOOL.

Points from the Report of the Chairman—Important Issues Raised.

In concluding his report for 1915 on the Government Miners' Training School, Mr. M. Fergusson, the Chairman of the Board of Control, writes:—The results obtained at the school during the year 1915 are, from a financial point of view, not encouraging. As a contributory cause to this disappointment it should be stated that the school suffered in common with all institutions for the advancement of the youth from the turmoil into which the whole country was plunged as the result of the European War. In fact so seriously were the operations of the school hampered, that at one period the number of apprentices in daily attendance had dwindled down to seventeen, and the loss on the school for one month amounted to £268 odd. The school lost a considerable number of its complement on the mobilization of the Defence Forces, and a further number who voluntarily attached themselves to the Union Forces for military operations in German South-West Africa. During the same period the number of applications for enrolment reached a very low ebb, as that section of the youth which would favour mining as a calling was, for the time being, also taken by the war fever and occupied in martial employment. The year being abnormal to an extreme degree, then it becomes a difficult task to find further contributory causes for the school not having come up to expectations, but I am of opinion, however, that the criticisms made in previous reports still hold good. You will recall that Mr. J. J. Wessels, manager of the Robinson Deep Mine, joined the Board in October, and I assumed the Chairmanship in November of 1914. Messrs. Shanks, Inspector of White Labour, and Mr. Jourdan, Assistant Inspector of Mines, carried on and completed the membership. The appointment of Mr. Wessels and myself followed on the resignation, owing to retirement, of Messrs. Moses and Van der Merwe. The loss of the services of these two gentlemen is keenly felt. Their ripe judgment and sound experience assisted greatly in the moulding of the institution, which has gradually grown from nothing. The newly constituted Board continued the deliberations of the old Board for the reorganization of the school. It analysed all the causes which in its opinion militated seriously against the successful operations of the school until, at the close of the year, it found itself in a position to tender to you a scheme for reorganization for submission to the Honourable the Minister. It was demonstrated that at the present time the school is adversely affected by a variety of causes, chief of which are the unfortunate selection of school site, the present terms of indenture, and other matters of a more domestic nature. Remedies were suggested in the nature of improvements to the school by way of provision of easy access, tree-planting, constructing tennis courts, and the provision of indoor recreation and amusement for the apprentices. The modification of the indenture was also recommended by reducing the age of admission to sixteen years and the period of apprenticeship to two years, and by the abolishing of the probationary period. The scheme also deals confidentially with other matters of reorganization. The Board feels assured that there are reasonable hopes for a greater measure of success in the future if its recommendations are accepted, and it is at the same time willing to deliberate upon any suggestions that may be submitted to it by any person or body qualified to make such suggestions for the betterment of the institution generally. That the school is still handicapped by the learner system obtaining on the mines of the Rand remains a fact. All the mines continue to sign on a large number of learners in the art of breaking ground. The big cheque is held out to these learners as an inducement for them to qualify in the shortest

possible time as rock breakers. It is no uncommon thing to hear a learner ask the mine captain on his visiting rounds, "When can I have a contract?" On the other hand, to hear the mine captain encouragingly urge on some learner to get acquainted with things as there is a contract waiting for him. Very few of this medley of learners ever become good and efficient miners; the vast majority of them develop only to the standard of mediocre workmen, and once they fall into the ranks of mine employees they drift about from mine to mine and eke out an existence. What is detrimental to the school interest in this learner system is that the mine learner starts on a comparatively higher wage, and is, within a few months, earning 10s. or 12s. a day. This comparatively high wage appeals to many apprentices and would-be apprentices, and the fact that by virtue of his apprenticeship he is getting a sounder ground-work which will stand him in good stead later on is completely lost sight of in the greed for an immediate higher wage. The result is he succumbs to the allurements of the mines and drops out of the school ranks at the expiration of his probation period or by paying off his surety bond. That apprentice, however, who thinks seriously, realizes that by sticking steadily to his job he is for the time being making no fortune apparently, but that he is thoroughly preparing himself to take on any task when he joins the ranks of the working miner on completion of his indenture, and that he has not been far wrong in his calculations is already evidenced by the measure of success achieved by the apprentices who have actually completed the period of indenture and identified themselves with the army of skilled underground employees. The Wolhuter apprentice, by the very nature of his varied experience and the strict discipline to which he is subjected, is particularly fitted for the part of shift boss, given a certain amount of ripening experience.

On Monday of last week a dinner was given at the Carlton Hotel by the South African General Electric Company in honour of Mr. Philip Herd, who is about to terminate his connection with the company, which has extended over a period of 18 years. Mr. Herd, who is very well known in electrical circles, has of late years been acting for the company in Capetown, and it was good news to his friends that, after spending a few months in England, he will return to Johannesburg to become a partner in the firm of Peabody, Rice & Wilson.

ANSWERS TO CORRESPONDENTS.

All inquiries addressed to the Editor must bear the writer's name and full address. We cannot reply to inquiries by letter, but telegrams with replies prepaid will be answered. Correspondents are requested to write their names and pseudonyms distinctly.

- "A. B." (East London).—(1) (2) (3) Future of all three highly speculative. Cannot advise you to average. (4) Possibly. (5) Should improve when the war is over. (6) Should improve, though not, perhaps, soon. See report Rand Klip meeting in this issue.
- "A. M." (Denver).—Copies of the issue in question sent you. Regret it is impossible to trace all the references to the subject during the past year.
- "H. M."—In liquidation. Nothing for the shareholders.
- "S. J. H." (Barberton).—Dividends will doubtless be nominal at first, gradually increasing as time goes on.
- "A. F. B."—(1) Yes, hold. (2) Highly speculative.

RECENT ADVANCES IN CHEMICAL INDUSTRY.—II.

[By PROF. J. A. WILKINSON.]*

THE tendency in this case is, however, to use those made from pure constituents, since their properties, as well as those of the binary compounds formed, can be more easily investigated. Much fundamental research has been accomplished recently in this direction, more especially with regard to the physical constants of the pure substances, but a knowledge of what has been done proves convincingly the magnitude of what there is yet to do. In addition to the metals already mentioned, a large number of alloys of the common metals, other than iron, have and are being investigated, but so far none of these have entered more extended fields of utility. The great progress made by physicists in the measurement of high temperatures in recent years has placed in the hands of the chemist instruments of invaluable assistance for the regulation of chemical operations on the large scale, and their use has contributed largely to increased efficiency in production. With this brief notice of the materials now available for industrial chemical operations, due to the advances in the methods of production made during the last two decades effected by a study of the requirements demanded in modern chemical processes, let us now turn to the industries themselves, confining our attention to those whose origin dates back no further than the conscious memory of most of us here to-night. When the navigation of the atmosphere by means of airships became a serious problem, the advantages, which would accrue from the use of hydrogen as a lifting medium were so apparent, that the methods of its technical preparation became at once a subject for immediate investigation, with the result, that it is to-day a commercial article of great importance. Formerly its chief use was limited to the working of the platinum metals, and for this purpose the ordinary text book methods sufficed for the preparation of the comparatively small quantities required. These, however, were soon found to be outside the limits of economy, and the following is a brief summary of the processes since utilised, most of which are new. (1) From acids by the action of metals: In spite of the fact that the cheapest acid and the cheapest metal, namely, iron and sulphuric acid, were used, this process proved expensive and tedious owing to the large quantities required, and has long since been discontinued. A pre-war Zeppelin had a capacity of 25,000 cubic metres, and a little calculation shows that 69 tons of iron and about three times as much chamber sulphuric acid would be required for the production of the necessary hydrogen. Later patterns are stated to require from one and a half times to twice as much. (2) From alkalis by the action of aluminium or silicon. Both these methods have been found convenient for military use in portable generators. A modification of the second method is known as the "hydrogenite" process, this substance being a mixture of ferro-silicon, sodium hydroxide, and slaked lime, which burns when ignited, producing hydrogen and the silicates of sodium and calcium, 1 kilo, yielding about 300 litres hydrogen. (3) From water: (a) By the action of "hydrone," a lead sodium alloy; (b) by the use of "hydrolith," commercial calcium hydride, prepared by passing hydrogen into molten calcium, 1 kilo, yielding about 1 cubic metre; (c) as a bye-product in the electrolysis of solutions of caustic soda and potash, and sodium and potassium chlorides. Large quantities are now obtained from this source at the low cost required for compression and storage; (d) by electrolysis, which unfortunately does not give a pure product, unless special precautions be taken; (e) by heating a mixture of barium sulphate and manganese oxide to a white heat and passing steam over the product so obtained; (f) by the action of steam on iron. This method is one of the most important, owing to the fact that the oxide of iron thus produced can be reduced by water gas, and so large quantities of gas can be obtained. The reactions take place at temperatures ranging from 700 deg. to 800 deg. C. and the technical difficulties of the process are now stated to have been overcome, so that pure hydrogen containing only traces of nitrogen can be prepared by this means. The method of

Bergius makes use of the same reaction in another manner, namely, by the action of water on iron filings at high pressures up to 300 atmospheres and at the comparatively low temperatures of 300 deg. to 350 deg. C. in the presence of catalysts. The yield is stated to be quantitative, the gas 99.95 per cent. pure, at once ready for use, and the cost about three-farthings per cubic metre. This process is also extremely interesting from a theoretical point of view, as it is one of the few chemical reactions, where the effect of high pressures has been studied; (g) by the action of steam on coke producing "water gas," which contains approximately equal volumes of hydrogen and carbon monoxide and about 8 per cent. nitrogen and carbon dioxide. By extracting the latter with alkalis and cooling the residual gases with liquid air, the nitrogen and carbon monoxide are liquefied and a gas of 97 per cent. purity obtained at a cost of 1½d. per cubic metre, and a second liquefaction brings this up to 99.3 per cent. and the cost to 2d. The carbon monoxide separated can be used for heating or power purposes to drive the liquid air plant. Thus the Linde-Frank-Caro process and the iron process mentioned above form the two chief methods for the technical preparation of hydrogen, the next in importance being the various electrolytic processes. (4) By the electric decomposition of compressed acetylene. The bye-product obtained in this process is lampblack, which finds a ready market. Although, at present, the practical utilisation of air ships lies in their military value and not in the direction of active competition with other modes of locomotion, yet hydrogen has been of service in many other ways, such as the manufacture of fused silica ware, the preparation of metallic filaments for electric lamps and autogenous welding of metal sheets. The discoveries of Professor Sabatier, of the University of Toulouse, and his pupils from 1897 onwards, of the preparation of saturated from unsaturated organic compounds by the use of metallic catalysts, especially nickel in a finely divided condition, and the specific application of this method by Norman in 1903 to the preparation of solid saturated acids and glycerine from the unsaturated liquid compounds by the addition of hydrogen have founded an industry, which is already extensive owing to the fact that bye-products formerly of little use can now be converted into stock for the soap and candle industries. It may interest members to learn that a "fat hardening" plant for this purpose has been at work in this country for a short time, whereby whale oil can be rendered of use for the manufacture of soap. The possibility of the manufacture of edible fats by this process assures its further development in the future. Again, the theoretical study by Professor Haber and his pupils of the conditions necessary for the union of nitrogen and hydrogen to form ammonia, led to the installation of a plant for this purpose in 1912 at Oppau. Incidentally, the further conversion of the ammonia produced by this or other means into nitric acid, by passing it in admixture with air over electrically heated platinum gauze has assisted to make Germany independent of external help for this valuable munition since the war began. Both these industries are of very recent origin, and there can be little doubt that both will assume larger dimensions in the near future, the former for the production of a necessary foodstuff, and the latter as a fertiliser of great potentiality. Both emanate from academic chairs, from that atmosphere of "pure" science, which is the nightmare of the self-styled practical man and the life-blood of his daily routine.

(To be continued.)

MINING EXAMINATIONS.

Study for Certificates as Mine Captains, Mine Managers, Surveyors, Mechanical and Electrical Engineers, and Engine Drivers. Private Tuition and Correspondence Lessons, where personal tuition is impracticable. Practical Mathematics and Electrotechnics. E. J. MOYNIHAN, Consulting Engineer, Cuthbert's Buildings, corner of Ellof and Pritchard Streets, Johannesburg, P.O. Box 2061.

THE WEEK IN THE SHAREMARKET.

Steady—Government Areas Improve—Improving Tendency.

THE feature of last week-end was provided by Government Areas, which at one time touched 49s. 9d., closing 3d. lower. On Saturday morning the market was generally easier, with the two exceptions of Kleinfonteins and Main Reefs, which were a turn harder. Government Areas once more engaged attention at the opening, and others were made in vain of 3s. 3d. for calls to the end of the year. Later, business was done at 3s. 6d. Van Ryn Deep, Rand Selections, Modder B's, City and Suburbans, City Deep, Brakpans and Bantjes were all below Friday's prices. The market opened steady on Monday, and generally speaking Saturday's rates were maintained, with the exception of Bantjes and Sub Nigels, both of which were easier. Small advances were noted in Springs, Nourse Mines, Kleinfonteins, Knight Centrals and New Elands. Springs had a further rise during the afternoon. On Tuesday morning there was very little change in prices. Springs Mines lost some of their overnight gains, and City Deep were also lower. Sub Nigels were the worst sufferers and fell still further after the call. Consolidated Main Reefs have at last freed themselves from their 17s. 9d.—18s. limit, which they have maintained for several weeks. In the afternoon Bantjes took another turn for the better. The vagaries of this stock are somewhat difficult to follow or account for. On Wednesday Bantjes were still to the good, also Clydesdales, City and Suburbans and Gedulds. Business in the Modderfontein group has become very quiet. Sub Nigels continued on the down grade. There has been somewhat more enquiry for Daggafontein new shares and options. The latter fell to 10s. 6d., but recovered to 11s. 3d. Areachaps have been standing at about 15s., Lorenzo Diamonds at 42s. 6d., Antimony at 3s. 9d. Henderson's new shares are 4s. 6d. buyers and options 1s. 2d. to 1s. 4d. In the course of the afternoon Sub Nigels recovered to the extent of 1s. Thursday being the Jewish New Year, the Stock Exchange was closed.

The market opened firm on Friday, and exactly double the business recorded on Wednesday was put through at the call. The following stocks all show advances on the last quotations: Bantjes 15s. 6d., Cloverfields 9s. 6d., Gedulds 44s. 9d., Government Areas 50s., Lydenburg Farms 8s. 3d., Kleinfonteins 27s. 6d., Nourse Mines 20s. 6d., Rand Selection 75s., Sub Nigel 26s., Springs Mines 67s. 9d., Van Ryn Deep 69s., and Zaaiplaats 7s. The above is a record of actual sales. Other improved quotations were noted in Consolidated Langlaagte 27s. 6d.—28s., East Rand Centrals 8s. 9d.—9s. 3d., Village Deep 31s., and New Modders £19 2s. 6d.—£19 10s. Sales of Modder B's were booked at £7 1s. ex London. Modder Deep only produced sellers at £7 10s. ex London. An offer of £19 10s. sixty days' buyer's option, was made for New Modders, but 2s. 6d. more was wanted. African Farms are neglected and nothing favourable can be said of tins.

	Fri., 22nd.	Sat., 23rd.	Mon., 25th.	Tues., 26th.	Wed., 27th.
African Farms	8 0*	8 0*	8 6	8 3*	8 3*
Apex Mines	5 10*	—	5 9*	6 0*	—
Aurora Wests	14 3	14 0*	—	14 3	—
Bantjes Cons.	15 0	14 6	14 2	14 2*	15 3
Blaauwbosch Diamonds	—	68 0*	68 0*	—	—
Brakpan Mines	92 0	91 0*	—	90 0*	90 0†
Breyten Collieries	19 0*	19 0*	19 0*	19 0*	—
Brick and Potteries	—	—	5 0*	5 0*	5 0*
Bushveld Tins	—	—	—	0 8†	—
Cassel Coals	24 0*	24 0*	21 0*	24 0*	24 0*
Cinderella Cons.	6 0*	6 6	—	6 9†	—
City and Suburbans	38 6	38 3*	38 3	38 0*	38 9b
City Deep	90 0†	87 6†	88 6	88 0	—

* Buyers. † Sellers. a Odd lots. b Ex London.

	Fri., 22nd.	Sat., 23rd.	Mon., 25th.	Tues., 26th.	Wed., 27th.
Cloverfield Mines	8 10	8 10	9 2	9 2	9 2
Clydesdale Collieries	10 0*	10 0*	10 0*	10 0*	10 6*
Concrete Constructions	3 3†	3 0†	3 6†	3 6†	—
Con. Investments	20 6*	20 0*	20 0*	20 0*	20 0*
Con. Langlaagte	27 0*	27 0*	28 0†	26 9*	27 0*
Con. Main Reefs	18 0	18 0*	18 0*	18 3*	18 6
Con. Mines Selections	24 0*	24 6	24 3	24 3	24 3b
Coronation Collieries	—	—	—	—	30 0*
Coronation Syndicates	—	3 0†	—	3 0†	3 0†
Crown Diamonds	3 6*	3 7*	3 9*	—	—
Crown Mines	53 9*	52 6*	52 6*	52 6*	—
Crown Mines Debs.	£100†	—	—	£100†	—
East Rand Centrals	—	—	—	8 6*	8 6*
East Rand Coals	3 0	3 0	2 11*	2 11	2 11*
East Rand Deep	—	1 3*	—	1 2*	1 3*
East Rand Minings	—	15 0*	16 0*	15 6*	15 3*
East Rand Props.	16 0*	16 0*	16 3*	16 3	16 3*
East Rand Debs.	£72 $\frac{1}{2}$ *	£72 $\frac{1}{2}$ *	£72 $\frac{1}{2}$ *	£72 $\frac{1}{2}$ *	£72 $\frac{1}{2}$ *
Eastern Golds	—	1 6*	1 6*	1 6*	1 6*
Ferreira Deep	30 0†	28 0*	30 0†	30 0†	30 0†
Frank Smith Diamonds	3 3	3 3*	3 3*	3 5*	3 7*
Geduld Props.	43 3	43 3*	43 3*	43 9	44 6
Geldenhuus Deep	—	20 0*	20 0*	21 0*	—
Glencoe Collieries	8 0*	8 6*	9 3†	8 6*	8 6*
Glynn's Lydenburgs	16 6†	16 6†	16 6†	—	—
Government Areas	48 9*	49 6	49 3	49 3	49 4 $\frac{1}{2}$
Jupiters	8 0*	8 6†	8 0*	8 0*	8 6†
Klerksdorp Props.	2 7*	2 7*	2 7*	2 7*	—
Knight Centrals	11 6	11 6	11 9*	11 11*	12 0
Knights Deep	—	—	—	21 0*	—
Lace Props.	6 1*	6 0*	6 0*	6 0*	6 0*
Luijpaardsvlei Estates	7 8*	—	—	—	—
Lydenburg Farms	8 3	8 0*	8 0*	8 0*	8 1*
Main Reef Wests	5 8	5 6	5 6	5 4*	5 3
Main Reef West Debs.	—	£58 $\frac{1}{2}$ †	£58 $\frac{1}{2}$ †	—	—
Meyer and Charltons	105 6*	—	—	105 0*	—
Middelvlei Estates	1 4*	—	1 4*	1 4*	1 4*
Modder B's	141 0	142 0b	140 0*	140 0*	140 6*
Modder Deep	148 0*	148 0†	147 0*	148 0*	148 0b
Leeuwpoort Tins	14 0†	14 0†	14 0†	14 0†	14 0†
Natal Navigation Colls.	17 0*	—	17 0*	17 0*	17 0*
New Boksburgs	1 10*	1 10*	1 10*	1 10*	1 10*
New Eland Diamonds	22 3*	22 6*	23 3	22 6*	22 0*
New Era Cons.	10 4*	10 3*	10 3*	10 3*	10 3*
New Geduld Deep	5 6	5 6*	5 5*	5 5*	5 6*
New Gochs	—	12 0†	—	—	—
New Heriots	—	50 0*	—	50 0*	50 0*
New Kleinfonteins	26 9*	27 0*	27 3	27 3	27 3*
New Modders	395 0†	380 0*	380 0*	380 0*	380 0*
New Rietfonteins	0 6*	—	0 9†	0 6*	0 6*
New Unifeds	10 6*	10 6*	10 6*	10 6*	10 6*
Nourse Mines	18 6*	18 0*	19 0*	20 0†	18 0*
Pretoria Cements	82 6*	83 0	—	—	83 0*
Princess Estates	2 0†	2 0†	1 9*	1 9*	2 0†
Rand Collieries	3 0*	—	—	3 0*	3 3*
Rand Klips	8 8	8 8	8 7*	8 9*	8 6
Rand Nucleus	—	1 9*	1 10*	1 10*	1 10*
Randfontein Deep	4 3*	4 5	4 4*	4 4*	4 5
Randfontein Estates	13 0*	13 9*	13 0*	13 0*	13 9*
Roberts Victors	10 0*	10 0*	10 0*	10 3*	10 6†
Rooibergs	11 0*	11 0*	11 0*	11 0*	—
Rondepoort Uniteds	10 9	—	10 9*	10 6*	11 0*
Ryan Nigels	2 6*	2 6*	2 6*	—	—
Shebas	2 0*	2 0*	2 0*	2 0*	2 0*
Simmer Deep	3 6*	3 7*	3 9b	3 9*	3 10*
S A. Breweries	32 0*	32 0*	32 0*	32 6	32 6*
S A. Lands	5 0*	5 0*	5 0	4 9*	4 10*
Sorings Mines	65 3	65 3	65 9	66 6	66 3*
Sub-Nigels	26 6*	26 9	26 6	26 0	24 9
Swaziland Tins	30 0†	—	—	—	22 6*
Band Selections	75 3*	74 9*	—	73 0*	74 3*
Transvaal Lands	17 6*	17 9*	18 3†	18 6†	18 3†
Transvaal G. M. Estates	22 6*	22 6*	—	—	22 6*
Van Ryn Deep	69 3	69 3b	68 9	68 9	68 6*
Village Deep	32 6†	29 6*	31 6†	31 6†	—
Vogel. Con. Deep	1 6*	1 6*	1 6*	1 6*	1 6*
Welgedachts	—	—	26 0*	26 0*	30 0†
Western Rand Estates	1 4*	1 6	1 4*	1 5*	1 5*
Witbank Collieries	40 0	—	41 6†	41 6†	—
Witwatersrands	55 0*	—	55 0	56 0†	56 0†
Wit. Deep	23 6*	23 6*	23 6*	23 9*	24 0*
Wolbuters	11 0*	11 0*	11 0*	11 3	11 3
Zaaiplaats Tins	6 6*	6 6	6 9	6 9	6 10
Union 5 p.c.	—	£101 $\frac{1}{4}$ *	—	£101 $\frac{1}{4}$ *	£101 $\frac{1}{4}$ *

* Buyers. † Sellers. a Odd lots. b Ex London.

THE WEEK IN THE MINING MATERIAL AND ENGINEERING TRADES.

Johannesburg Marking Time—A State of Expectancy—Building New Ships in Britain.

THE commercial world of Johannesburg is existing in a state of anxious expectancy to-day. Hence a deadening effect on the buying capacity, owing to the absence of enterprise, as there is no undercurrent of speculation anywhere visible, and altogether there has not been such an experience of marking time for many months past. As a rule brokers and merchants are very diffident in expressing opinions, therefore enquiries had to be pressed home, because when effects are apparent there must be some reasonable explanation. The chief one seems that the mines have slowed down their purchases very considerably. In this respect a few crisp extracts from the recent annual meeting of the Simmer and Jack will materially assist in elucidating why the mines are not buying so freely. The gross yield of that company for the year was £7,150 more than the previous year, in spite of a decrease of 10,400 tons treated, hence the yield was 5½d. per ton better. Working costs, which included plant renewals, showed an increase of 1s. 6½d. per ton. This is due largely to the prevailing war conditions, such as the increased cost of stores and mining material alone representing 9d. per ton, and it can safely be said that but for rigid economy in the use of stores and the most careful buying the effects of the war would have been more severely felt. On June 30th, 1916, stores on hand represented £66 000, as compared with £46 000 in June, 1915, and £37,000 in June, 1914. Therefore these actual figures show nearly double stocks on hand now as compared with the pre-war period, hence it is not surprising that a slight halt, to put it mildly, has been called in piling up stores *ad libitum*. The inefficiency of white labour through so many being away was also referred to; the extra war levy; the payment of part wages of those at the front and other abnormal expenditure in consequence of the war conditions were also emphasised. At one stage in our enquiries attention was turned to one or two from the mine buying departments, but very little information, however, was available, as it is very evident that most are content to purchase whatever is requisitioned by the mines, and there the matter practically ends. It is not so with the oversea importers' representatives here, on the spot, who study every phase on the trade horizon. From them it was ascertained that they are not looking for much betterment or any outstanding buying until after the turn of the year, and we are already practically in the last quarter, and no doubt the mining people have prepared a rough plan for the Christmas dividends which no doubt will be as big as possible in view of the circumstances and more particularly to sustain and enhance our future credit in the world's financial markets. One word more must be mentioned and that is whilst the mines will only buy from hand-to-mouth, yet occasionally a big order for piping, machinery and spares comes along owing to some unforeseen happening on a mine which cannot be provided against, as after all underground mining is no child's play at the depths now worked.

FREIGHTS AND NEW SHIPPING.

As mentioned last week the New York to South Africa rates had been sharply raised, which has been confirmed by a further cable giving the details as from four to five dollars per ton advance. It was further ascertained that the American Atlantic seaboard remains rather nominal, owing to labour difficulties, but rates remain steady. Regarding South American rates it was gathered that an intermediary boat following rather too closely on the heels of a regular liner had to accept nearly £2 per ton less than the recognised price to fill up cargo space. Time charters, according to London advices, remain steady from all parts, for twelve months trading. The British-South African rates remain stationary, and the shipping companies concerned expect them to remain so for a long while. In connection with

shipping, it is satisfactory to record that the British Government are giving more facilities and encouragement to private yards to build commercial ships, to meet present and future requirements. According to the tenor of the oversea shipping gazettes and all the local information available, much activity is anticipated after the war.

HEAVY RAILWAY RATES TO RHODESIA.

In a conversation with a second-hand material dealer, it was learned that an average charge of £10 per ton was made for railway carriage from Johannesburg to Rhodesia, which was retarding business considerably. He gave an example, that a second-hand battery stone-crusher of about eight tons could be had in Johannesburg for £100 and then the railway charges came to £80 for carriage, which he considered was out of all proportion. The question was asked as to how other places compared with the Johannesburg rates, and the reply was that only second-hand mining machinery was available on the Rand, and the new naturally went from the coast to Rhodesia, hence the contention was that special facilities should be given in war times.

AGRICULTURAL MACHINERY.

The fat stock show in the Johannesburg Show Grounds has proved a success from a professional standpoint. It is also expected that the machinery merchants, and particularly those catering for all kinds of dairy appliances, will have a welcome spurt in business. Up to the present the demand from the agricultural districts has not been up to the average, as the great majority of farmers also seem to be marking time and Micawber-like, waiting for something to turn up. As one large second-hand dealer remarked if only the rains would come what a difference it would make in business throughout Johannesburg and the country generally. So far the big machinery houses have booked a few orders for ploughs, cultivators, harrows, and small motors, chaff cutters, as well as mealie grinders for the cattle, also hay and wool presses. The influx of farmers into Johannesburg is valuable, not so much for the amount of business done at the time, as for the aftermath, after quiet consideration at home, when orders dribble through either direct or by way of the country storekeepers.

OILS, COLOURS, PAINTS AND WHITE LEAD.

There is a little business doing in the Far Eastern Transvaal, in the Middelburg and Witbank districts more particularly. The travellers in the Barberton district give poor

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returns, chiefly on account of the drought, and the mining industry is somewhat moribund, although there is a more optimistic feeling as regards the future after the war. The trade in Johannesburg has been better than that of the June month, which is not saying over-much for the position. White lead has recovered its balance, as the urgent sellers have cleared their surplus stocks and the standard price for the best is again 72s. 6d. per 100 lbs. We are not getting any from America at the present time, and it is problematical whether we shall get any direct consignments of white lead from there for some time, as the importers state there is some arrangement made by the makers that white lead has to go through their London agents.

MINE CHEMICALS.

The price of mercury is erratic. A broker secured 20 bottles from various sources, some under £20, and others even a fraction over. To import mercury it costs about £20 per 75 lbs. bottle to land here, as the price in London is £17 15s. The mines have extra good stocks of all mine chemicals, therefore there is hardly sufficient business to test values. The strictly commercial chemical business is good in the town, and the Johannesburg and Reef hospitals, as well as the military hospitals, are always putting out very decent orders.

REVISED PRICE LIST.

Approximate war prices, subject to quick change.—Mining and building hardware: Iron, imported, round up to 1 in., 30s.; 2 in. to 6 in., 25s. per 100 lbs. Ditto, square, up to 1 in., 27s. 6d.; 1½ in. to 2½ in., 23s. 6d.; 2½ in. to 5 in., 25s. Flats, 3-16in., 37s. 6d.; all from 1 in. up, 30s. Angles, 1 in. to 3-16 in., 40s.; 1 in., 35s.; 5-16 in. to 3 in., 30s., excepting 5 x 4 x 1 in.; mild steel bar, 4½d. lb.; drill, 7 lb.; steel plates, 10ft. by 4ft. by 1-16th in., 35s.; 1 in., by 3-16in., 32s. 6d.; 1 in. to 5-16th in., 31s.; 1 in., up to 30s.; 10ft. by 5ft. by 1-16in., 36s. 6d.; 1 in. and 3-16in. 34s.; 1 in. to 5-16in., 32s. 6d.; 1 in., up to 31s. 6d.; intermediate sizes up to 12ft. by 6ft. by 1-16in., 37s.; 1 in. and 3-16in., 34s. 6d.; 1 in. and 5-16in., 38s.; 1 in. and up 32s., all at per 100lb.; hexagon and cupboard bolts, 1 in. diameter to 2½ in., 55s., over 2½ in., 52s. od., 1 in. to 2½ in., 50s., over 47s. 6d., 1 in., 1 in., up to 2½ in., 45s., over, 42s. 6d.; nuts, 10d. lb., 2½ in., 60s., 1 in., 57s. 6d., 1½ in., 1½ in., 62s. 6d., 2 in., up, 67s. 6d.; washers, all sizes, 45s.; rivets, 3-16in., 1s. 1d. lb., 1 in., 5-16in., 10½d., 7-16in., 1 in., 7½d., 1 in., 45s., 1 in., 42s. 6d., 1 in., up, 40s. lb.; shoes and dies, 32s. 6d. to 35s. per 100lb.; rails, £23 per ton; picks, 4lbs., 27s. per dozen; shovels, 32s. 6d. to 50s. per dozen; drill hammers, 5½d. lb. to 9d. lb.; hammer handles (best American), 14 in., 3s. 6d., 24 in., 8s., 30 in., 11s., 36 in., 13s., per dozen; metal, anti-friction, 1s. per lb.; galvanised iron, 24 gauge, 6 ft. to 10 ft., 10½d., 11 ft., 10½d., 12 ft., 11½d.; 26 gauge, 6 ft. to 10 ft., all lengths, 9½d. to 9½d. per ft. all-round; flat galv., 18 to 24 gauge, 35s. 6d.; 26 gauge, 36s. 6d. 100 lbs.; floor brads, 32s. 6d.; ceiling, 33s.; wire nails, 35s. to 55s. per 100 lbs.; solders, 50 per cent., 1s. 2d. per lb.; locks, rim, 48s.; mortice, 60s. dozen; barbed wire, 23s. 6d. to 25s. 100 lb. coil.

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Bricks, cement, lime, etc.: Cement, nominal, 34s. 6d. per cask; Pretoria Portland, 9s. 3d. per bag; 8s. 3d., truck loads; lime, white, 7s. 9d.; truck loads, 6s. 9d., slaked; do., 5s.; blue, 3s. 6d.; plaster lime, 4s.; bricks at kiln, stock, 37s. 6d. to 42s. 6d.; wire cuts, 42s. 6d. to 50s. pressed, 65s. per 1,000, road transport very scarce; salt and white glazed bricks, £27 10s per 1,000; tiles, roofing, £17½ square; glazed tiles, 10s. 6d. to 17s. 6d. yard; paving cement tiles, 8s. 6d. yard laid; terra cotta tiles, £15 per 1,000; reinforced concrete columns, 6 ft. plain, 22s. 6d., duted, 24s.; fireclay bricks, £9½, good average, per 1,000; clay chimney pots, 80s. per doz.; fireclay, 37s. 6d. ton on rail.

Oils, paints, lead, oxides, glass: Linseed, raw, 26s. 6d.; boiled, 26s. 6d. per 5-gall.; white lead, 70s. to 72s. 6d. 100 lbs.; turpentine, 49s. 2/4 gall.; 10/1, 54s.; coal tar, imported, 10s. to 12s. 6d. per 5 gallons.; oxide in oil, 35s. to 36s. per 100 lbs.; dry oxide, 21s. to 22s. 6d.; S.A. crude oxide, 12s. 6d.; linseed oil putty, 4s. 6d. per 12½ lbs.; bladders, 36s. casks of 100lbs.; grease A.F. axle, 23s. 6d. to 25s. per 100 lbs.; tallow, 1s. per lb.; White Rose paraffin, 17s. 3d. 2/5; Laurel do., 17s.; petrol, 27s. 6d. 2/4; motor oil, 6s. to 7s. 9d. per gallon; engine lubricating oils, 22s. to 35s. per case; cylinder, 25s. to 40s.; paints in tins, 10d. to 1s. per lb., according to quantity, and if ordered to be mixed, 20 per cent. on pre-war rates. British plate-glass, ½ in., 3s. 6d.; do., mirror, 4s. 6d.; window, 16oz., 1s. to 1s. 3d. foot.

Chemicals: Mercury, £20 per 75 lb. bottle; bichromate potash, 2s. 6d. lb.; chlorate, 2s. 6d. lb.; permanaganate, 9s. lb.; alum, 5d. lb.; carbolic acid, 7s. 9d. lb.; borax, 90s. 100 lbs.; cyanide soda, 1s. 5d. lb.; hypo, 9d. lb.; acetate lead, 70s. 100 lbs.; litharge (assay), 70s. (commercial), 55s. 100 lbs.; zinc sheets and blocks, 1s. 6d. lb.; plumbago crucibles, 5d. per number.

Electrical Goods: Lamps, high volts., British, Holland & American, 16s. to 21s. wholesale, and 21s. to 27s. dozen. retail; carbon lamps, 7s. 6d. per dozen; pure rubber flex, 5d. to 6d. per yard; 3/20 coils of wire, 25s.; do., 3/22, 21s. 6d.; tubing, 12s. to 13s. 100 ft.; keyholders, 4s. each; round blocks, 3½ in., 3s. 6d. doz.; lamp holder cord grips, 13s. 6d. doz.; switches, 5 amp., 13s. to 14s. doz.; British glass shades, 24s. to 36s. doz.; Bohemian shades finished; porcelain shackles, 14s. 6d. doz.; do., bobbins, 9s. to 9s. 6d. per 100; cleats, 18s. per 100; P.O. insulators, 18s.; motors, 3 h.p., about £28 to £35, new.

The Lonely in August.

The following are particulars of the output of gold from the Lonely mine for the month of August, 1916:—Mill ran 683 hours; crushed 5,200 tons; fine gold recovered, 987.994 ozs., value £4,152 15s. 9d.; slimes treated, 5,200 tons; fine gold recovered, 2,555.201 ozs., value £10,743 10s.; total recovery of fine gold, 3,543.195 ozs.; total value, £14,896 5s. 9d.; estimated profit, £6,110.

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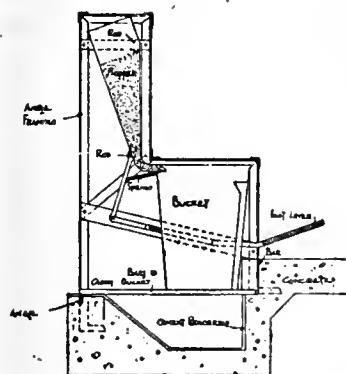
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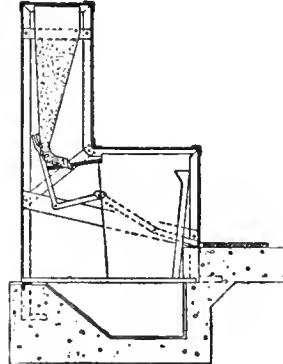
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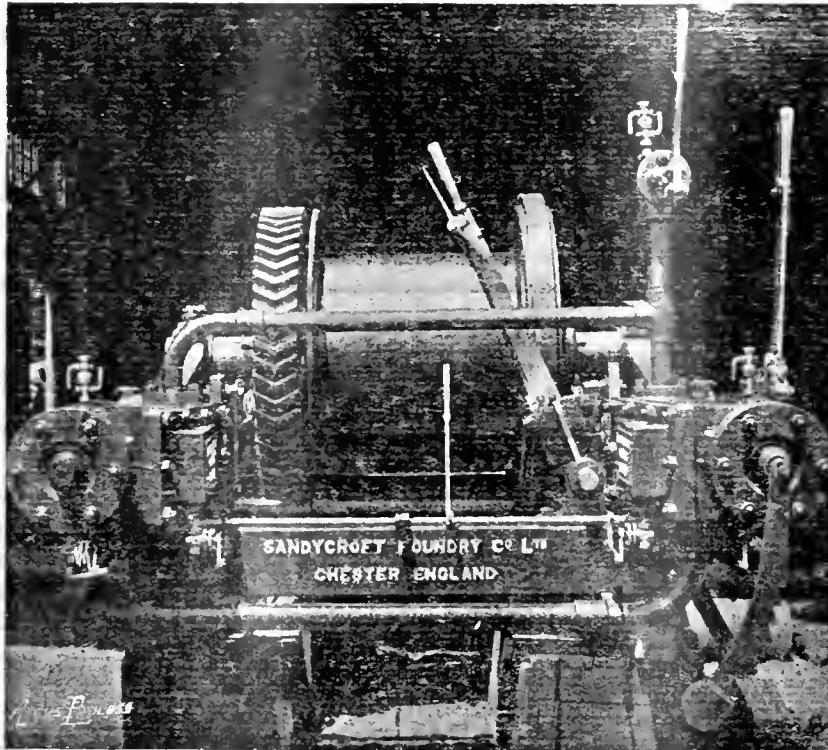
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Engineering Notes and News.

THE ZUURBEKOM PUMPING STATION OF THE RAND WATER BOARD.

On the occasion of the visit of the South African Institution of Engineers to Zuurbekom on the 23rd September, 1916, the following notes on the Zuurbekom pumping station were supplied by the Chief Engineer:—The water-rights over the farm Zuurbekom were acquired by the Johannesburg Waterworks Estate and Exploration Company, Ltd., in 1897. Shafts and boreholes were subsequently sunk and temporary pumping commenced in April, 1898, but since August of that year pumping has been practically continuous, and at present Zuurbekom is the main source of the Board's water supply. When the Rand Water Board took over the Johannesburg Waterworks Company in 1903, the following shafts and boreholes had been sunk at Zuurbekom:—

Name of Station.	No. of Shaft or Borehole.	Shaft Depth in ft.	Borehole Depth in ft.	Total Depth in ft.
Main station ...	1	136	364	500
	2	Shafts sunk and then abandoned and subsequently filled in owing to failure of supply.		
	3			
Secondary station	4	83.5	206.5	290
	5	76	224	300
	6	113	—	113

The water raised at the various boreholes was pumped from the secondary station to the main station, and from there it was re-pumped to the Paarlshoop pumping station at Langlaagte. The principal supply was drawn from No. 5, where the plant consisted of two three-throw well pumps driven by two compound horizontal steam engines. When the works were acquired by the Board the quantity of water available at Zuurbekom was about two million gallons per day. On the completion of the Zwartkopjes scheme, where it was anticipated that a supply of 8.8 million gallons per day would be available, the Zuurbekom station was practically shut down. In January, 1911, however, owing to the rapidly diminishing yield of the Zwartkopjes boreholes and the increased demand for water, the present Chief Engineer recommended the Board to go in for a scheme for the further development of the water supply at Zuurbekom, and work was commenced on No. 6 shaft early in 1911, and two bell crank bucket and plunger pumps were installed. A new shaft (No. 7) was also sunk in the coal measures about a mile from the main station. This shaft was carried to a depth of 115 feet and an 18 inch borehole was sunk for a further 81 feet from the bottom of the shaft. This source of supply yielded on test 780 000 gallons per day. At the main station the pumping plant consists of three inverted pumping engines of the marine type, each with a nominal capacity of 800 000 gallons per day. With the further development at Zuurbekom in 1911, it was necessary to lay an additional pipe line 11.08 miles in length (16 inch and 18 inch) to the Rand, and instal additional pumping plant. After mature consideration, it was decided to instal electrically driven centrifugal pumps with current generated at Zwartkopjes. The power is generated at Zwartkopjes at a voltage of 3,000 and transmitted to Zuurbekom at 16,500 volts, where the current is transformed down to 3,000 volts. The current is three phase, 25 cycles, and the length of the transmission line is about 17½ miles. The cost at the switchboard is 0.283 pence per unit. The plant is protected against lightning discharges by aluminium arrestors and water jet arrestors, a complete set being fixed at each end of the transmission line. The new electrical pumps installed at the main station comprise two Weise and Monski centrifugal pumps, each capable of delivering 2.5 million gallons per day against a head of 700 feet, one Weise and Monski delivering 2.5 million gallons per day against a head of 1,150 feet, and one Rees roturbo, delivering 2.5 million gallons per day against 1,150 feet head. At the beginning of 1913 the supply had been increased to 5,125

million gallons per day, as compared with a little over two million gallons per day in 1910. The second stage of the development was the sinking of a new shaft (No. 8) between Nos. 4, 5 and 6, with the intention of connecting Nos. 4, 5, 6 and 8 by headings, so that the whole of the water could be raised from the central shaft (No. 8). In addition, a 22 inch borehole was sunk to a depth of 205 feet from the bottom of No. 4 shaft, and the yield increased to such an extent that the existing plant at the secondary station could not cope with it. The total quantity available, after the 22 inch borehole had been sunk in No. 4 shaft, was about 6.35 million gallons per day. Prior to this borehole being sunk the quantity available was 5.125 million gallons. When No. 8 shaft reached a depth of 73 feet the influx of water was so great that work had to be stopped until larger pumps could be obtained from Europe. The following vertical spindle pumps were ordered: Two Sulzer centrifugals, each capable of raising five million gallons per day against a head of 155 feet, and one Mather and Platt centrifugal pump capable of raising 2.25 million gallons against a head of 225 feet. At present the Mather and Platt pump is installed in No. 4 shaft and pumps water direct to Zwartkopjes. One Sulzer centrifugal has been placed in No. 6 shaft and the other in No. 8 shaft. At present the available yield is 7.25 million gallons per day, but this will probably be slightly exceeded when the scheme is completed. It is ultimately intended to instal the whole of the vertical spindle centrifugal pumps in No. 8 shaft and close down the plant at the other shafts, as, by doing this, the working costs will be considerably reduced. No. 8 shaft is yielding 3.3 million gallons per day at present, but in due course the shaft will be sunk a further 20 or 25 feet, and the whole of the water will then be diverted to this shaft. The demand, however, is so great at present that it is impossible to do any further sinking. It may be mentioned that the electrification of the Zuurbekom station has resulted in a saving of about £3,000 per annum.

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NEW MACHINERY AND PLANT IN THE UNION.

With respect to new machinery and plant, introduced during the year 1915, which in value amounted to £606,682 (including diggers and works £9,907), the chief items, according to the annual report of the Government Mining Engineer, are as follows :—

TRANSVAAL.

	Gold Mines.	Coal Mines.	Base Mineral Mines.
	£	£	£
Boiler plant (other than that of locomotives, traction engines or steam wagons)	4,982	2,076	290
Headgear	7,520	2,608	—
Steam engines for winding	8,209	1,875	255
Steam engines for compressors (including compressors)	3,874	2,036	—
Pumps	28,740	2,876	1,164
Steam locomotives	5,725	6,656	—
Reduction plant	64,315	—	6,486
Washing plant	—	7,012	—
Treatment plant	16,548	—	706
Workshop plant	15,551	637	111
Electric generators and engines, hoists, locomotives and motors	55,411	4,099	633
Power lines, transformers, bells, telephones, etc.	78,642	1,333	205

The most important items comprise stamp mills and tube mills for the new mines on the Eastern Rand, winding plants for these mines, electric winders for other mines, and increases in the electric plant at central power stations.

Rock Drills.—The average number of rock drills used in the gold mines of the Transvaal Province was, during December, 1915 :—

	Non- Producing.	Producing.	Total.
	5,630	45	5,675

Increase, Dec., 1915, on Dec., 1914 — 18 —
Decrease, Dec., 1915, on Dec., 1914 ... 590 — 572

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The actual total number of rock drill machines in commission on the Witwatersrand gold mines during December, 1915, was 9,123, of the following types :—Large reciprocating piston machines, 4,741; small reciprocating piston machines, 1,995; air-feed hammer machines, 2,068; hand hammer machines, 319. Rock mined during the year by means of rock drills amounted to 42·6 per cent. of the total tonnage hoisted on the Witwatersrand. The decrease in the use of rock drills in 1915 is due to the abundant supply of native labour, which enabled the latter to replace machine drilling where such replacement was more advantageous.

MECHANICAL COAL CUTTERS.

The following table shows the number of coal cutters in use in December, 1915, the class of power employed, and the percentage of mining work accomplished by machines over the year :—

Province.	Electricity.	Compressed Air.	Total.
Transvaal	1	326	327
Cape	2	—	2
Orange Free State	—	4	4
Natal	13	147	160
Union of South Africa	16	477	493
1914	25	448	473

BOILERS.

The number of inspections and hydraulic tests of boilers carried out by the inspectors of machinery during the year were as follows :—External inspections, 4,599; internal inspections, 4,041; hydraulic tests, 1,824. Resulting from these inspections permission to use was granted in nearly every case, it being, however, temporarily withheld in several

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MINE SURVEYOR'S
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The aggregate percentage passes for the
combined classes is nearly 80% OVER 200 SUCCESSES.

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instances until necessary repairs or cleaning had been carried out. Each of the new boilers inspected was considered fit for the steam pressure asked for. The stationary boilers (numbering 767) of the Department of Railways and Harbours, which are not exempted from independent inspection under the Mines and Works Act of 1911, are inspected and tested by six district boiler inspectors, who are appointed under section 3 of the Mines and Works Act of 1911 and whose reports are forwarded to the Mines Department. The work carried out during the year comprised: External inspections, 748; internal inspections, 702; hydraulic tests, 517. The number of boilers in which it was considered necessary to reduce the working pressure was 26 in the Transvaal, five in the Cape, five in the Orange Free State, and 15 in Natal. In these cases as formerly, the reason for this reduction of pressure was generally the wasting of the plates due to internal corrosion or bulges due to overheating. The defects met with in boilers during the past twelve months' inspections presented no element of novelty, and do not call for any special remarks.

New Boilers.—The new boilers registered during the year are shown in the following classifications:—

TRANSVAAL PROVINCE.

Type.	1915.
Cylindrical multitubular, externally fired	2
Cylindrical multitubular, internally fired	—
Lancashire, Cornish, and Galloway	—
Lancashire, Cornish and Galloway, combined with multitubular	2
Locomotive type (other than those of Government railways, traction engines, etc.)	33
Vertical	14
Water-tube—Straight	14
Water-tube—Curved	—
Traction engines (boilers of)	1
Steam wagons (boilers of)	—
Miscellaneous	—
Totals	65

WINDING PLANTS.

The following table shows the position at the end of the year with respect to winding plants licensed for the conveyance of persons at the mines:—

	Tiansvaal.
Inspections during the year—Satisfactory	101
Inspections during the year—Unsatisfactory	8
Tests of brakes during the year—Satisfactory	75
Tests of brakes during the year—Unsatisfactory	10
Permits in force at the end of the year	374
Mines affected	78
Shafts	238
Compartments	660
Ropes in use on licensed hoists	651
Licensed capacity—persons	10,433

ELECTRICAL MACHINERY.

The following table shows the total units disposed of during the year by the power stations of corporations and municipalities, and by public supply companies. The units used for mining purposes, out of the totals shown in the table, amount to 533,546,468 electrical and 147,928,535 compressed air units. The outputs of the power plants on the mines are not included in the table:—

	Direct.	Alternating.
Transvaal	22,820,266	707,212,164†
Cape	17,356,043	22,426,823
Orange Free State	599,186	1,834,063
Natal	8,086,758	12,047,005
Total for 1915	48,863,153	743,520,055
Total for 1914	46,168,510	603,286,880‡
Total for 1913	42,490,911	555,181,027*

† Includes 147,928,535 units of compressed air.

‡ Includes 121,014,096 units of compressed air.

* Includes 123,081,136 units of compressed air.

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MECHANICAL LABORATORY.

During the twelve months ended 31st December, 1915, 1,211 applications for tests were received, and 1,223 certificates were issued, the figures for the previous year being 1,316 and 1,295 respectively. The revenue collected amounted to £2,394 18s., as compared with £2,566 16s. for the previous year. Details of the certificates issued are as follow:—

Particulars of Certificates Issued.	Number.
Wire Ropes—Whole tests	1,178
Wire Ropes—Complete tests	6
Wire Ropes—Wires only—in tension, torsion and bending	2
Wire Ropes—Wires only—fatigue tests	2
Manilla Ropes—Whole tests	—
Attachments for Wire Ropes—Tensile tests	1
Detaching Hooks	1
Barber Wire for Fencing—Tensile tests	2
Belting—Tensile tests	1
Boiler Tubes—Expanded into plates	1
Boiler Tubes—Oxy-acetylene welding	1
Cement	10
Concrete Blocks	1
Concrete Cylinders (reinforced)	1
Freestone	1
Iron Bars	2
Monel Metal	1
Springs for wagon or motor lorry	2
Timber	1
Truck Shackles and Attachments	2
Turbine Blades	1
Wheels—Steel, for motor car	1
Galvanized Iron Sheets	5
Total	1,223

Wire Rope Tests.—The majority of the tests carried out at the laboratory were the half-yearly tests of wire ropes used for the raising and lowering of persons, as required by the Mines, Works and Machinery Regulations. As in previous years, the reduction in the breaking loads of ropes which had been only six months in use was exemplified in several cases, chiefly where such ropes had been used in compound shafts. In 20 cases the periodical test disclosed much greater deterioration than would be anticipated from external examination, and the authorities at the mines concerned were notified immediately.

Electric Transport on the Rand.

Underground ore haulage is an ever-present problem on the Rand—especially now that on the larger properties main straight gathering levels are being quite generally driven. The extent to which electric locomotives have been adopted is, perhaps, not generally realised; but the fact that 59 electric locomotives of one make alone are in use, shows that their advantages are already quite widely appreciated. Main haulage ways, designed for large tonnage, are, in most instances, best served by the overhead trolley type of locomotive. This generally involves the installation of a conversion plant for transforming alternating three-phase power direct current of suitable voltage (250 or 500 volts). For other levels, and especially those handling smaller tonnage, and from which several cross-cuts run off to the face, self-propelled locomotives, equipped with storage batteries, offer great advantages. Machines of this type are running successfully or are about to be put in use on several Witwatersrand mines—notably, Crown Mines, East Rand Proprietary, Klerksfontein and Government Areas. Such locomotives require for their charging comparatively small and inexpensive conversion plants. Similar installations on larger scales are very common in the United States. A few years ago any machine requiring storage batteries for its operation was

looked at askance by engineers—and wisely so. The perfection of the Edison steel-nickel cell has changed all this for there is hardly a piece of apparatus in use to-day which is more robust or better suited to withstand rough handling than the Edison storage battery. It is not alone on tram tracks that electricity has come into its own for the transport of heavy materials. Electric lorries have proved their worth for surface deliveries of mine stores, such as dynamite, coal and heavy stores. Large electric trucks, equipped with Edison batteries, are in use on the East Rand, Knights Deep, Simmer Deep and Crown Mines, and are effecting great savings of time and money. It appears therefore that economies of money and native labour can be effected by the further introduction of electricity in transportation.

Pulverised Coal for Locomotives.

The Committee of the International Railway Fuel Association in charge of the subject summarises the advantages of pulverised coal in locomotive practice as follows: (1) Smokeless, sparkless, and cinderless operation; (2) maintenance of maximum boiler pressure within a uniform average variation of three pounds without popping; (3) an increase of from 7.5 to 15 per cent. in boiler efficiency as compared with burning lump coal on grates; (4) saving of from 15 to 30 per cent. in fuel of equivalent heat value fired; (5) enlarged exhaust nozzle area, resulting in greater drawbar pull and smoother working of locomotive; (6) elimination of ashpit delays, facilities and expense and reduction of time required for and ease in firing up; (7) maintenance of a relatively high degree of superheated steam; (8) no accumulation of cinders, soot or ashes in superheater of boiler flues, smokebox or on super-heater elements; (9) no punishment or overheating of firebox, new or old sheets, rivets, patch bolts, stay or flue beads; (10) elimination of arduous manual labour for building, cleaning and dumping fires; (11) avoids expense and annoyance of providing various sizes and kinds of fuel; (12) eliminates the necessity of front end and ash pan inspection, and for special fuels, firing tools and appliances for building fires and for stoking and cleaning fires; (13) equal provision with engineer for fireman to observe signals and track, thus reducing liability of accident. "Your Committee," concludes a recent report on the subject, "is of the opinion that the effectiveness and utility of the use of fuel in pulverised form has been demonstrated from the past year's development, and that progress in the use of this method of stoking and burning bituminous and anthracite coals and lignites for generating power, heat, and light on railways will be marked from now on." It is stated that railways in many countries are now seriously considering the use of pulverised coal, and that some in the United States are already installing pulverising plants.

How to Store Cement.

It is sometimes thought that only one thing is necessary for the safe and effective storage of cement—a tight roof. Many years' experience has convinced S. P. Baird that water-tight storage is not enough, and he has given, in *Engineering News*, the following requisites for cement storage: (1) Cement will retain its strength for an indefinite period when stored in airtight containers. (2) Cement will be injured less by storing in paper sacks than in cloth sacks, everything else being equal. (3) Cement in any kind of commercial packages will be injured least while in storage if the packages are piled as closely together as possible. In other words, the outside surface of the pile of sacks should be the smallest amount possible. (4) Piles of cement sacks should be covered with a tarpaulin to prevent, as far as possible, the circulation of air through the pile. Note the word "tarpaulin"; an ordinary canvas cover is not a tarpaulin, but a paulin. Five parts coal tar, one part gasoline and one part good japan drier make a water-tight black coating for canvas. Surface condensation often takes place on a stored sack of cement. The moisture is carried into the cement, to its great injury, as well as the practical destruction of the sack. The destruction of the sack may not be evidenced at once; but it may be returned to the mill and refilled and sent to some other job, where it bursts and is paid for by a person who is in no way responsible for its condition. There is a saying among cement men that if you turn your cement—that is, move it from one pile to another—once a month, it will not be injured by an indefinite period of storage. This is not the case; pile it closely and cover it as nearly air-tight as possible, and you will have very little caked cement. If the cement is caked, it is better to let it alone until you are ready to use it rather than break the cake, thus presenting fresh cement to the action of the air.

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New Companies.

Steenkoolspruit Coals, Ltd., 8 Knox Street, Germiston; capital £15,000.
 Abdul Rahim Company, Ltd., 19 Commissioner Street, Johannesburg; capital £250.
 Joosub Suliman Doerat, Ltd., 61 Terrace Road, Burgersdorp, Johannesburg; capital £1,800.
 Laher & Patel, Ltd., Rietfontein Road, New Primrose, via Germiston; capital £1,500.
 Amosa, Ltd., 2nd Floor, B. & T. Buildings, 68 Commissioner Street, Johannesburg; capital £12,000.
 Egne, Ltd., 2nd Floor, B. & T. Buildings, 68 Commissioner Street, Johannesburg; capital £13,000.
 White River Estates, Ltd., White River Estate, via Nelspruit, Transvaal; capital £30,000.

FOREIGN COMPANY.

New Compound Diamonds, Ltd., care Thomas Edward Duckles, 83/84 Exploration Buildings, Johannesburg; capital £25,000.

ALTERATION AND ADDITION TO FOREIGN COMPANY.

Joseph Baynes, Ltd., Johannesburg.

SPECIAL AND EXTRAORDINARY RESOLUTIONS.

The Columb Tyres Import Co., Ltd., Johannesburg; new articles.
 United Meat Distributing Syndicate, Ltd., Johannesburg; reduction of capital.
 K's Buildings, Ltd., Pretoria; powers of directors.
 Erasmus Building Syndicate, Ltd., Pretoria; liquidation.
 A. W. Warder & Co., Ltd., Johannesburg; alteration of articles.
 Cafés, Ltd., Johannesburg; powers of directors.
 Norwood Trading Co., Ltd., Johannesburg; appointment of director.
 Brady & Verseput, Ltd., Johannesburg; liquidation.
 South African Co-operative Stores, Ltd., Johannesburg; liquidation.
 Station Colliery, Ltd., Witbank; alteration of articles.

PROSPECTUSES.

Platkoppie Exploration Co., Ltd., Johannesburg.
 Boeren Handels Maatschappij, Beperkt, Johannesburg.

CHANGE OF NAME.

Transvaal Coal Trust Co., Ltd., to Rand Selection Corporation, Ltd.

IN VOLUNTARY LIQUIDATION.

Erasmus Building Syndicate, Ltd., Pretoria; capital £20,000.
 South African Co-operative Stores, Ltd., Johannesburg; capital £500.
 Brady & Verseput, Ltd., Johannesburg; capital £1,000.

CHANGE OF ADDRESS.

South African Contracting Association, Ltd., 78/9 Fourth Floor, Sacke's Buildings, corner Commissioner and Joubert Streets, Johannesburg.
 Technical and Commercial Corporation, Ltd., 78/9 Fourth Floor, Sacke's Buildings, corner Commissioner and Joubert Streets, Johannesburg.
 Orenstein-Arthur Koppel, Ltd., 78/9 Fourth Floor, Sacke's Buildings, corner Commissioner and Joubert Streets, Johannesburg.
 Robert Gregg, Ltd., 216 St. Andries Street, Pretoria.
 Pretoria Retailers Council, 216 St. Andries Street, Pretoria.
 Farmers' General Trading Co., Ltd., 10 Goodman's Buildings, Commissioner Street, Johannesburg.
 Ilex Trading Co., Ltd., 72 Permanent Buildings, 2nd Floor, Johannesburg.
 H. Heiberg, Ltd., Jooste & Bryant's Buildings, 104 Commissioner Street, Johannesburg.
 Tayler & Ries, Ltd., 100 Fox Street, Johannesburg.
 The Kepodra Estate, Ltd., care S. Patel & Co., Treurfontein, District Lichtenburg.
 A. Sonnenberg & Co., Ltd., 115 Marshall Street, Johannesburg.
 Stowarts & Lloyds (South Africa), Ltd. (Foreign), care A. H. Bullock, Dowell Buildings, Loveday Street, Johannesburg.
 The Montrose Exploration Co., Ltd. (Foreign), care J. H. Keegan, Trust Buildings, Fox and Loveday Streets, Johannesburg.
 Joseph Baynes, Ltd. (Foreign), care Albert Hudson, care Nel's Rust Dairies, corner Harrison and Welmarans Streets, Johannesburg.
 Cafés, Ltd., Room 66, Empress Victoria Hotel, 37 Marshall Street, Johannesburg.
 Suleman Ebrahim, Ltd., Seventeenth Street, Vrededorp, Johannesburg.

New Patents.

223. John Namath, of 151 Main Street, Johannesburg, Transvaal.—An improved disinfectant and germicide and the like.
224. (1) Lancelot Ussher, (2) Armour Hall, both of 1 Loveday Street, Johannesburg, Transvaal.—Improvements in or relating to containers for carbide and the like.
225. William Smith Thomas, c/o P.O. Box 668, Johannesburg, Transvaal.—Improvements in rotating hammer percussive apparatus.
226. Amos Leslie Knight, of 24th and Locust Streets, Philadelphia, in the County of Philadelphia, State of Pennsylvania, U.S.A.—Improvements in or relating to typographic moulds.
227. (1) Karl Baumann, of Northwoodhouse, Barnfield, Urmston, in the County of Lancaster, England, and (2) The British Westinghouse Electric and Manufacturing Co., Ltd., of 2 Norfolk Street, Strand, London, England.—Improvements in blades or vanes for steam turbines.
228. (1) Karl Baumann, of Northwoodhouse, Barnfield, Urmston, in the County of Lancaster, England, and (2) The British Westinghouse Electric and Manufacturing Co., Ltd., of 2 Norfolk Street, Strand, London, England.—Improvements in steam turbines.
229. (1) Lancelot Ussher, and (2) Armour Hall, both of 1 Loveday Street, Johannesburg, Transvaal, P.O. Box 345.—Improvements in valves, cocks and the like.
230. Rudolph Goch Else, c/o P.O. Box 668, Johannesburg, Transvaal.—Improvements in spraying nozzles.
231. Walter William White, of 125 High Holborn, in the County of London, England.—Improvements in or relating to the separation of volatile products from solid carbonaceous material.
232. (1) The Wireless Hinge Manufacturing Co., Ltd., of 263 George Street, Sydney, in the State of New South Wales, Commonwealth of Australia, and (2) George William Berry, of Old South Head Road, Rose Bay, near Sydney, in the State of New South Wales, Commonwealth of Australia.—An improved method of an apparatus for hinging lids of tins, canisters and like receptacles.
233. Oliver Trevillion Jenkins, c/o P.O. Box 668, Johannesburg, Transvaal—Improvements in rock drilling tools with detachable ends.
234. (1) Frederick Victor William Swanton and (2) Samuel Akland, both of No. 6 Standard Bank Chambers, or P.O. Box 230, Johannesburg, Transvaal.—Improvements in folding furniture.
235. Henry E. Ellsworth, of Simsbury, Connecticut, U.S.A.—Improvements in fuses.
236. William John Gee, of 48 Kingsmead Road, Tulse Hill, London, England.—Method of separating solids from suspension in liquids and apparatus therefor.
237. Walter Harrison Biddle, of 25 Victoria Street, Westminster, in the County of London, England.—An improved method and apparatus for automatically compensating the expansion or contraction of wires, rods or the like.
238. Walter Harrison Biddle, of 25 Victoria Street, Westminster, in the County of London, England.—Improvements in apparatus for actuating signals on trains and for stopping trains independently of drivers.
239. Walter Harrison Biddle, of 25 Victoria Street, Westminster, in the County of London, England.—Improvements in and connected with automatic railway signalling, train control or the like.
240. William Marriott, of the Grange, Brinton, Melton Constable, in the County of Norfolk, England.—Improvements in or relating to reinforcements for reinforced concrete constructions.

Manicaland Output.

The mineral output of the Territory of the Companhia de Moçambique (Manicaland) for the month of August was as follows:—Manica Alluvial: Cubic metres dredged, 91,185; fine gold, 1,103.67 ounces; value, £4,575 2s. 4d.

New S.A. Companies Registered in London.

The Bloemendaal Syndicate, Ltd., was registered in London on August 25 with a capital of £5,000 in £5 shares, to acquire mining and other property in South Africa. Minimum cash subscription 10 per cent. of the shares offered. The number of directors is not to be less than two nor more than seven; the subscribers are to appoint the first. Qualification, 10 shares. Solicitors: Frank Simmonds & Carter Registered office, 3 London Wall Buildings, London, E.C.

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The Week's Meetings.

SUB NIGEL, LTD.

The annual meeting of the Sub Nigel G.M. Co., Ltd., was held in the board-room, Consolidated Gold Fields on September 22, Mr. D. Christopherson presiding. There were represented personally and by proxy 239,966 shares out of an issued capital of 431,580 shares.

The Chairman, in moving the adoption of the report and balance sheet, said:—

Gentlemen.—In submitting the report and accounts for the year ended 30th June, 1916, I propose to comment, firstly, on the accounts; secondly, on the results obtained last year; and, lastly, on the present position of the company, taking into consideration the latest known factors which may have affected the position since the close of the financial year.

As regards the accounts, there are one or two items to which attention might be called and, if there is any further information required thereon or on other points than those I propose to deal with, I shall be glad to give it. On the debit side of the balance sheet, the first item that calls for comment is reserve gold, valued at £50,000. During the year under review, in certain months the profits were considerably better than the value which the reserve at that time justified, and consequently it was thought desirable that declared profits in those months should be somewhat reduced as compared with the actual profits. As the position of the gold reserve account is published with the results for each month, shareholders are able to estimate the actual profit and, at the same time, are given an indication whether the actual results of any one month are considered abnormal or not. Sundry creditors show a considerable increase over last year, due to a dividend of 5 per cent. having been declared for the period ended the 30th June, 1916 (but not payable until 16th August) as compared with no dividend for the corresponding period last year. On the credit side of the balance sheet "stores in hand" show an increase of some £7,000, due to a large extent to the desirability in these times of having in stock an extra reserve supply of stores and mining material necessary for the continuity of operations on the mine. Share investments appear at a slightly reduced figure owing to dividends having been written off the book value of the shares. Since the close of the year 3,000 Beyton Colliery shares have been sold at a price which has returned the capital invested plus interest. The item cash, London, Johannesburg, Nicel, and at mine amounts to £72,000. Of this £21,579 will be paid out on account of the dividend declared for the period ended 30th June, 1916. £12,000 is held against the company's liabilities for wages, stores and sundries, whilst the balance roughly represents capital not invested in stores and other realisable assets, and is, therefore, not available for distribution.

Last Year's Results.

Turning to the results obtained last year, the report of the superintending engineer and the manager clearly shows what the improvement has been as compared with the previous year. A closer examination of details brings out some interesting points. The value per ton milled was approximately the same for the two years, namely, 39s., 10d., and 29s. 8d., but the working cost (excluding the charge for renewals and replacements, which charge in 1915 was very heavy owing to considerable expenditure in connection with increasing the capacity of the plant having to be charged out under this head-

ing) were for 1916 down 3s. per ton milled. The larger tonnage milled would naturally to a considerable extent account for this; but, on the other hand, war conditions have prevailed, with the consequent ill-effects. One of the most pronounced ill-effects of war conditions is the material rise in the price of stores and mining material. What this has meant to the Sub Nigel is clearly demonstrated by the manager's statement for June last, in which month, if the stores issued for that month had been obtainable at pre-war prices, the profits would have been increased by £550, or at the rate of £6,000 a year, which represents, on the basis of the average profit for last year, two months' profits. Amongst other ill-effects have been reduced efficiency owing to many employees being on active service, and the increased cost of gold realisation. Working costs for the year under review have also been burdened with a heavier cost for development, due to the development footage having been increased by 2,637 feet. In passing, it might be remarked that the development footage last year exceeded by over 1,000 feet any footage previously recorded for this mine in any one year. Under these circumstances I think, gentlemen, we can agree with Mr. Leslie, the superintending engineer, when he states that the mine management is to be congratulated on the work of the past year.

I will now turn to what, to this company, is an all important item, "Ore reserves." At the 30th June a re-estimation of the ore reserves showed 214,000 fully developed mine tons of a value of 91 dwts. per ton, and 24,000 mine tons partially developed of an indicated value of 96 dwts. This shows an increase of 20,000 fully developed tons as compared with last year, with an improved value of 13 dwts.; but I am glad to be able to inform you that, up to the present, since the close of the financial year the position has still further improved both in tonnage and value.

On the 12th August last a circular was issued to shareholders by the secretaries of the company giving a summary of the disclosures opened up by recent development. When that circular was issued it appeared that the limits of the pay chute on the 14th level in C shaft had been reached, but, to the pleasant surprise of all concerned, the chute made again, and to-day I am able to tell you that a further 40 feet has been added, showing excellent values. This drive has within the last few days encountered a fault which was met with on the 14th level. Previous to meeting this fault the reef exposed some further improvement in width.

Important Development Work.

In the E shaft area there is some important development work now being carried on. If you will kindly refer to the map attached to the report you will notice that two chutes are shown in the lower levels of this E shaft area. A winze has been sunk on the eastern chute to the horizon of the 14th level, and this winze discloses payable values throughout. On the western chute a winze has been sunk from the 11th level to a depth of 59 feet, disclosing an increase in width of reef from 2½ feet to nearly 9 feet of good value; but Mr. Leslie sounds a note of warning when he states:—"Too much importance should not be attached to these high reef widths, which are without parallel elsewhere in the mine, and which occur in a pay chute extending a distance of 75 feet where intersected on the 11th level."

The important development referred to by me is the 14th level drive being advanced from the bottom of the winze on the eastern chute to intersect both of these chutes. This work, when completed, will disclose whether these chutes have not only maintained good reef widths and values, but whether, as in the case of the chute on the 15th level in the C Shaft area, they

have increased in lateral extent. Up to date this drive has opened up the chute, that is the eastern chute, for a lateral distance of about 230 feet, as compared with 150 feet on the 11th level. The latest information is that the drive going westwards is now apparently out of the eastern pay chute, and it now remains to be seen how soon the chute on the western side will be encountered, and to what extent this chute has maintained the width and values found in the winze referred to, and also what difference there may be in the lateral extent. In the meanwhile this same drive going east is still in payable ground in the eastern portion, and it is fairly safe to assume that the lateral extent of this chute will be greater than the 230 feet I have just mentioned.

Another important drive is being proceeded with on the 11th level in the E Shaft area. This drive is going west through a large dyke which was met with. A borehole located the reef beyond this dyke, the width and value being low. Although it is admitted that there are no definite indications that payable chutes will be found in this section of the mine it was unanimously agreed by the board to follow the advice of our engineers and put in a pilot drive to test this ground, as if in this large section of the mine (representing slightly over half of the

whole claim area—that is, excluding the claims recently acquired—excluding blocks of claims recently acquired as referred to hereunder), payable chutes are found it must necessarily add great value to your property.

Underground Position Improved.

Since the close of the financial year the underground position has so improved that consideration may have to be given before the end of the current year to the advisability of making preparations to increase the crushing capacity of the mine to a total of, say, 11,000 tons per month. The board will go thoroughly into the position with the engineers, and, should circumstances warrant a decision to proceed on these lines, shareholders will be at once informed.

Since the 1st July, 1916, and up to 15th September a further 1,680 feet of development has been sampled, giving values of 17.8 dwts. over a stoping width of 42 inches, a distinct improvement on the figures shown in the engineer's report for the year ended June 30, 1916. Disclosures from development work during the last few months have undoubtedly improved the future prospects of the company. The larger lateral extent of some of the chutes, the improved reef widths and the high values found in the lower levels of the mine, all tend to make one hopeful as to the future, but, gentlemen, there is a lot of work to be done before these most encouraging indications can be sufficiently substantiated to justify your directors recommending a more ambitious programme of putting the mine and plant in a position to deal with a materially increased tonnage. It can hardly be expected that so large a footage on payable reef will continue month by month, more especially as the programme of development in the near future is laid out, not only to disclose information as soon as possible as to the trend, size, and value of the payable chutes, but also with a view to mining and handling the ore from those chutes in the most inexpensive way, and therefore there will be a considerable amount of dead development work. Under these circumstances shareholders must exercise a little patience and not be carried away too much by present day indications, and at the same time not be too disappointed if any one quarter of the year does not favourably compare with the development value for last quarter, which must

be considered abnormal compared with the average values to be expected. At the last annual meeting of shareholders I stated "There is every reason to think that the results for the current year should show a marked improvement as compared with the past year." I think that statement has been fully justified. This year I venture to make the same forecast, as, in spite of the fact that expenditure on development will be exceptionally heavy and probably even higher than last year, profits should show a material increase for the current 12 months. There can be no doubt that the underground position of the mine is better and more encouraging as regards the prospects for the future than has ever been the case before, but, as I have said before, there is yet a lot of work to be done before the favourable indications to-day can be well substantiated. In this regard I hope by the time we meet next year development work will disclose information which will largely confirm our more optimistic hopes for the future.

Acquisition of Claims.

Before concluding, I wish to refer to the acquisition by your company of a further 383 claims (approximately). If you will again refer to the map attached to the report you will see where these claims are situated and how desirable it was to obtain them. Some shareholders on looking at the map might be inclined to think that with such a large area of the property still unexploited there was no particular hurry to obtain these claims, but the other way of looking at it is, and it is the way your directors viewed the advisability of purchasing, that the known payable ore chutes on the Sub Nigel all trend towards these claims. You will further notice that in the "B" shaft area a winze has been sunk from the 15th to the 16th level. On the 16th level the drive has disclosed reef of very high value. This level will eventually pass westwards through the top of the triangular piece of ground immediately below "D" shaft. If, therefore, when this drive is advanced further high values be met with the value of these 383 claims would greatly appreciate and there is no doubt that they would not be obtainable at the same price as we have been able to secure them. If in course of time we are advised to sink another shaft and ensure the position of the ore reserves by carrying out more advanced development, it may well happen that the acquisition of these claims might prove essential to such a programme, and this also influenced the decision to purchase. Under these circumstances there can be but little doubt that shareholders will confirm our action in having purchased the claims now instead of waiting when we might have had to pay considerably more.

Since the outbreak of war 49 of the employes have been on active service in some field of action or other, and at the present moment out of a total of 124 employes there are 26 in the field. Up to now I am glad to say that we have no reports as to any of these men having been killed or died, but I regret notification has been received that the following have been wounded:—T. Gracie (German East), A. W. Craig (oversea), A. Hitchman (oversea).

We extend our sympathy to them in their suffering, and trust they have received no permanent injury, and if such is the case may they have a speedy and complete recovery. Our acknowledgment and appreciation are due to Mr. C. D. Leslie, our superintending engineer. The present improved position of the company is largely due to the advice and attention he has given as regards the development of the mine and other matters concerning

the general operations on the mine. I would also again like to refer to the services of Mr. Frank Dunning, the manager, who has carried out his duties in such a way as to have won the appreciation of not only the board but also the engineers. To both these gentlemen our thanks are due. I now beg formally to move the adoption of the report and accounts.

Mr. Paul Dreyfus seconded the resolution, and referred to the satisfactory position of the company, which had been improved by the purchase of two blocks of claims, which would considerably increase the life of the property. He quoted figures to show that from a loss of £13,483 in 1911 there now was a profit of £32,759.

Mr. Cohen's Hopeful Views.

Mr. J. A. Cohen said:—I think shareholders are to be congratulated for two reasons—primarily, because the future outlook of this company is full of promise, and because the most recent convert to this view is one of the largest shareholders, who for years has been closely identified with the management and control of this company; and if proof of this were wanted, I need only refer you to the very frank and outspoken statement made by the chairman to-day. I do not for one moment wish to appear in the nature of a critic, either destructive or otherwise. It is a fact, however, that it was not until the development disclosed for the past six months that, generally speaking, a more optimistic opinion was entertained by those who were in a position to judge what the future prospects of this company were likely to be. Speaking as a shareholder, apart from my position as a director of the company, I am satisfied that the best technical advice has been brought to bear in the opening up of your mine, and I should like to take this opportunity of expressing my appreciation and thanks for the untiring work and energy displayed by your superintending engineer, Mr. C. D. Leslie, and with him I should also like to associate the work performed by the manager, Mr. F. G. Dunning.

No Hasty Conclusions.

The chairman has, in my opinion, been cautious in his remarks, and rightly so, as, notwithstanding the astonishingly good development of the past six months, it would be a mistake if one were to rush to hasty conclusions and attempt to forecast the future in such a way as to carry shareholders, so to speak, off their feet.

Reviewing the position as it stands, we can congratulate ourselves in the knowledge that the true characteristics of the mines in the Far East Rand have been disclosed in this property, i.e., the persistency of the reefs, varying in thickness both laterally and in depth, and carrying big values, the most pleasing feature being the widening of the reefs throughout the mine as a whole. If these occurrences continue on the lower levels—and indeed indications point to their doing so—it does not require much imagination to convince even the most ardent pessimist what this will mean to the shareholders. I have heard criticism as to our system of development, which, as you are aware, is being conducted on the known pay chutes. It has been said indeed by those who are in a position to criticise our mining operations that we have been indulging in what may be considered selective development. I am quite alive to this fact, and appreciate that at some future period less satisfactory exploratory results may be looked for, inasmuch as it will be necessary to conduct part of our development in non-pay reef in order to carry through the necessary lateral and vertical connections. I am not prepared, however, to admit that by developing in the pay chutes we are acting differently from the policy practised by the other leading producers on the far East Rand. Our critics should be reminded that it is only within the last few years that definite evidence has

proved that the gold in this area is disseminated in chutes, and with the known pointers of a slate foot-wall and quartzite hanging, the difficulties of locating the pay chutes are largely overcome.

Sound in Every Respect.

I contend, therefore, that the present method of development is sound in every respect, as the maximum amount of payable ore is developed at an infinitely lower cost than would be otherwise.

Up to now an area equivalent to over 632 claims has proved the existence of five clearly-defined chutes, whilst to the west of your property a similar claim area has not as yet been attacked other than by the exploratory development drive, which has been extended from the 11th level of E shaft. Assuming new chutes are encountered here, the effect of such a discovery on the value of your property would in my opinion be far-reaching. I look forward, therefore, with confidence to the day when your present equipment will be either considerably increased or augmented; and the gratifying feature, to my mind, is that whilst your engineers are engaged in proving the potential possibilities of this mine, shareholders are placed in the almost unique position of receiving a satisfactory return on the money invested at present prices, leaving everything else that may be discovered as the speculative possibilities of this far East Rand proposition. I now have much pleasure in supporting the motion.

Replying to a question, Mr. Christopherson said that he thought they were quite safe for the present rate of interest—namely, 10 per cent.—but he could not say whether there would be any increase.

Mr. W. P. Fisher also congratulated the company on its satisfactory position and urged that the quarterly reports should in future be issued earlier and in more comprehensive form.

The Chairman replied that the reports must in fairness to all concerned be issued simultaneously in London and Johannesburg. A little delay must consequently occur of necessity.

The report and balance sheet were adopted.

The appointment of Mr. Jack Andrew Cohen, vice Mr. E. Turk, resigned, was confirmed. Messrs. D. Christopherson and F. Leslie were re-elected directors. Messrs. Douglas, Low and Co. and Roberts, Hays and Co. were reappointed auditors. This concluded the business.

SIMMER AND JACK, LTD.

The annual meeting of the Simmer and Jack, Ltd., was held in the board-room, Consolidated Goldfields on September 22, Mr. D. Christopherson presiding. Out of a total of 3,000,000 shares 1,611,627 were represented personally or by proxy.

In moving the adoption of the report, Mr. Christopherson said:—From the printed reports and accounts now before you you will observe that the result of working during the year under review was less profitable than in the previous year. The gross yield for the year was £875,150, some £7,150 more than last year in spite of a decrease of 10,400 tons in the tonnage treated, the declared yield being better by 5d. per ton. Working costs, however, including expenditure on plant renewals, increased by £54,500 or £s. 6d. per ton, and the profit from working therefore shows a decrease of £47,400 or £s. 1d. per ton. Sundry revenue shows a slight improvement, whilst the charges for profits tax and special war levy, owing to the re-

duced profit, are appreciably less than last year. The net result of the year's operations is that a sum of £270,900 (some £25,000 less than last year) was carried to appropriation account and out of this £262,500, equal to 81 per cent., was distributed in dividends as compared with £300,000 or 10 per cent for the year ended 30th June, 1915.

I have mentioned that working costs were higher by 1s. 6d. per ton milled. This increase is due largely to prevailing war conditions. The cost of stores and mining material has considerably increased in price; efficiency has suffered owing to many experienced employees being away on active service; and these factors have been reflected in the increased underground costs, which accounts for the bulk of the increase in total costs.

Mining Costs.

In addition, mining costs have suffered owing to 50,000 tons less reclamation ore and because this class of ore is less accessible than formerly and consequently it is not obtained as cheaply as hitherto. In former years shareholders have been warned that, as reclamation areas in the upper levels became exhausted, it was probable working costs would increase, and this has happened during the year under review, but possibly to more than a normal degree. The superintending engineer in his report, after referring to the reduction of reclamation rock from the upper levels, states:—"The difficulties attendant on changing to deeper level mining were accentuated by dislocation of hoisting operations while more powerful winding engines were being installed at Nos. 1 and 2 shafts and, during the period of rearrangement, there was a temporary depreciation in underground efficiency, when working costs increased materially." It may however, be noted that in spite of these difficulties, the working costs of this company were materially below the average obtained in mines of similar capacity.

Development costs per ton crushed also show a somewhat higher figure, due to a larger footage, 9,079 feet as compared with 6,281 feet in the previous year. Of the total increase on costs, 50 per cent. or 91 per ton milled is due to the increased cost of mining supplies. This matter has engaged the closest attention of your administrative and technical management ever since war began, and it can safely be said that but for rigid economy in the use of stores and the most careful buying the effects of the war in this respect would have been much more felt by your company. Stores and materials on hand figure in the balance sheet at over £63,000, as compared with £46,000 and £37,000 at 30th June, 1915 and 1914 respectively. This gives some indication of the extent to which we have been buying in advance of our immediate requirements and a comparison between the current prices of the principal stores used and the book value of stocks of similar stores on your company's books shows that this policy has been well justified and that your company has been enabled to effect an appreciable annual saving thereby.

The manager in his review of the year's operations again emphasises the unsatisfactoriness of the white labour supply. It may be he slightly understates the extent to which the withdrawal of so many of our more highly-trained officials and employees for war service is a contributory factor to this condition of affairs. There

is, however, no doubt that the practical absence of any extensive organised system in the training and subsequent employment of underground learners, to which he principally attributes the difficulties mentioned, is to a very large extent responsible for the general inefficiency of the underground white labour force. At present, outside of the Wolbutter Training School, which is carrying on excellent, although limited, work in this connection under the supervision of Mr. R. H. Wannacott, there is no properly organised method of dealing with underground learners. It is true the various mining companies take on learners, but unfortunately in many cases so soon as such learners obtain just sufficient knowledge of mining to enable them to obtain a blasting certificate, they at once look for and obtain work as a miner.

Insufficient Training.

Consequently they start on a mining career with insufficient training and it is doubtful if many of them ever become thoroughly efficient at their work. This question is now receiving the serious consideration of the industry.

Turning to the ore reserve position, at the 30th June, 1916, it is estimated there were 1,935,000 mine tons fully developed, valued at 5.2 dwts. being a decrease of 220,000 tons as compared with the previous year but no change in value. In addition to this ore reserve, there is a large tonnage of ore to be mined from reclamation sources. There is not sufficient data to estimate the amount and value of this latter tonnage, but in both respects there is reason to think it will be considerable.

The supply of native labour has been unusually free during the year, the average number employed being 4,155 as compared with 3,285 during the previous year. The number of natives coming in for work during the last few months has not been so large as in the latter months of 1915, and the early months of 1916, but there are indications of an improvement in this direction in the near future. As regards the prospects for the current year, these must largely depend on the continuance or otherwise of war conditions. Should war conditions prevail throughout the year, then we cannot expect any betterment of the various disabilities (such as scarcity of trained employees and the higher cost of supplies), under which we have had to work for the past two years. The superintending engineer, however, as you will see from his report, states that if profits cannot be expected at the rate earned in the earlier months of the past financial year there is every reason to hope that the mine will show a material improvement on the markedly low results during recent months.

While dealing with the report of the superintending engineer, I should like to draw your attention to a paragraph in which it is stated that the actual decrease in working profit as between this and the previous year was £111,370. This figure compares with the figure of £47,400, which I have mentioned above and the difference between the two figures is due, as the superintending engineer states, to the fact that during this year declared profits were assisted by drawing some £34,000 from reserve gold, and during the year ended 30th June, 1915, declared profits were less than profits actually earned by some £34,000, which was the value of gold added to reserve during that year. As you know

the reserve gold account is operated upon to equalise profits so that in months when the actual profit earned is more than what may, for the time being, be regarded as a normal month's profit, gold is added to reserve, which is drawn upon in a similar manner to assist profits in months when the profit earned is below the normal. This particular instance shows how fairly this system works for, of the £34,000 worth of gold placed to reserve during the year ended 30th June, 1915, no less than £31,000 was taken from the abnormal profits earned during October, November, and December, 1914, when profits were unduly swelled by unusually high returns from tube mill liners and launder clean ups, etc. A comparison, therefore, of differences between actual profits earned, unless accompanied by some such explanation as I have given herein, may prove misleading to shareholders, and it is for this reason that I have drawn your attention to the paragraph referred to.

Valuable Services.

I have to commend to your attention the valuable services which your company has received from Mr. C. P. Powell, the manager, and his staff. Of an average number of 517 white men employed, 159 have at various times been allowed away on active service since the war started. The number now on service is 125 or over 24 per cent. of the average number employed, many of them the most highly trained men whom it has been difficult and in some cases impossible adequately to replace. It speaks a lot for the loyalty and energy of those who have remained behind, many of them much against their own desire, that the work of the mine has been carried on so efficiently during the past year, and they have the satisfaction of knowing that if it has been denied to them to help in the fighting line their services have been of value to the Empire and to South Africa in that they have contributed their quota to the maintenance of the output of gold.

I regret to have to report that the following of our employes have been killed or have died on service:—

German West.—E. M. Thompson, Wit. Rifles.

Flanders.—Lieut. T. H. Clesham, 17th Manchester; Lieut. C. E. Cumming, R.F.A.; Captain C. P. Watson, S.A. Infantry; Sergt. V. J. Rathfelder, Munster Fusiliers; Corp. H. Horn, 3rd Transvaal Scottish.

German East.—Sergt. W. H. Flynn, 3rd. S.A. Horse; Sergt. E. M. Tucker, 7th S.A. Infantry; Pte. E. J. Smith, 7th S.A. Infantry; Pte. J. W. H. Morkel, Van Deventer's Scouts.

The following have been wounded:—

Flanders.—Lieut. Rawlinson, Cambridgeshire Regiment; G. J. Cleverly, 2nd Transvaal Scottish; J. B. Hewitt, 3rd Transvaal Scottish; G. Ridge, 3rd S.A. Infantry; L. Metelerkamp, 3rd S.A. Infantry; W. Clark, 4th S.A. Infantry.

German East.—G. Kilroe, Motor Transport; H. Morrish, 5th S.A. Infantry; W. M. Sharp, 9th S.A. Infantry.

To the family and relatives of those men who have died I am sure you will wish me to extend our sincerest sympathy. To those who are wounded a speedy and complete recovery.

In conclusion we have to acknowledge the valuable services rendered during an unusually trying year by Mr. C. D. Leslie, our superintending engineer, and his staff.

I now beg formally to move the adoption of the report and accounts.

Mr. C. H. Barclay seconded and the report and balance-sheet were adopted.

The retiring directors, Messrs. C. H. Barclay and W. S. Smits, were re-elected.

Messrs. Douglas, Low and Co. and T. A. White were reappointed auditors. This concluded the business.

RAND KLIP MEETING.

The annual general meeting of shareholders of the Rand Klip, Ltd., was held on September 27 in the Board Room of National Bank Buildings. Mr. Wm. Dalrymple presided, and there were also present Messrs. E. H. Read, A. G. Gill, W. H. B. Frank, J. J. Hardwicke, W. Fitchet, C. J. Fernbank, W. J. Gau, S. M. Nelson, A. P. Richter, W. P. Fisher, W. Stephen, J. C. Davidson, F. E. Scriven, J. E. Jones, J. A. P. Gibb, and Geo. W. Austin (acting secretary). The total representation was 111,358 shares out of an issued capital of £432,336.

The Chairman said: Gentlemen,—In submitting for your consideration the report of the directors for the year ended 30th June last, and the accounts covering the same period, there is nothing significant to which I need draw your special attention in the balance sheet. It may, however, be noted that the revenue derived from rents and interest is about £530 in excess of the current expenditure, and your cash asset is something over £16,000. On the occasion of our last annual meeting I took the opportunity of reviewing the exploratory operations and development which had been carried out on your property since work was commenced, showing that when the mine had to close down through exhaustion of working capital 2,409 feet of shaft sinking and 6,177 feet of development in drives, winzes, and rises had been completed. Of this footage 4,595 feet were on reef; the average value of the exposures was 4.6 dwt. over 21.7 inches. It is significant, however, that there was improvement in values in the development carried out on the 3rd or lowest level, as the 235 feet sampled on that level gave an average value of 8.4 dwt., over 27.4 inches. The question of providing an effective working capital to continue exploration and development on a comprehensive scale, and in the event of a payable mine being established to make provision for the necessary reduction works has been constantly in front of the board, and we estimate that the minimum amount which will be required for carrying out this policy will be £700,000. In reviewing this question your directors have had to consider factors which have come to light through the experience of others in the exploration of the mining areas on the far East Rand, one of the most important being that there is no system of rich impregnations over areas extending for great distances along the strike of the reef as has been experienced in the development of the gold-bearing ground in the Central Rand; but rather that the gold is found in patches at irregular distances apart, and having their longer axes approximately north-west and south-east, that is to say, on the dip of the reef. Consequently it has come to be generally recognised that in tackling a mining venture in this district the correct policy is to aim at a large area and provide or have guaranteed, ample working capital at the offset. From a "memorandum on the far East Rand," compiled by the Government Mining Engineer, which was published by the Government in the form of a Blue-book, two points emerge clearly. The first is that in the opinion of the Government Mining Engineer, the mynpacht and owners' rights to which you

are entitled on proclamation of the farm will probably be somewhat on the small side assuming that the values obtained approximate the average values, as arrived at by him for the far East Rand. Of course this question of the size of the area to be worked would not be so vital if we were successful in opening up a grade such as the Van Ryn Deep or the Modder Deep. The second point is that in view of the opinion expressed by the Government Mining Engineer and the recommendations he makes, it is highly probable that during the next session of Parliament legislation will be introduced by the Government amending certain features of the present Gold Law, and, amongst other things, making provision for just such a case as that of your company by rendering it possible for us to acquire by lease or otherwise some portion of the Government ground surrounding the mynpacht, thus enabling the company, when asking for money, to offer a venture generally more attractive to investors. Another method of acquiring an area of sufficient size to form a "workable mining proposition" as defined by the Government Mining Engineer in his memorandum already referred to, would be the amalgamation of your company's mynpacht with one or more neighbouring properties. So far, however, it has not been possible to place any proposal of this nature before you.

Raising of Fresh Capital.

Now on the question of financing an established company with a large body of shareholders in war time there is an aspect which must not be overlooked. The method of raising fresh capital in normal times has been to secure a guarantee that the full amount of the capital required will be subscribed for on terms which will permit of a very large proportion of it being offered for subscription by the shareholders pro rata to their holding in the existing capital of the company. Thus each shareholder is able to maintain his pro rata interest in the venture. At present the capital of your company is distributed approximately as follows:—In Great Britain, 530 shareholders holding 250,000 shares; in South Africa, 500 shareholders holding 115,000 shares; allied and neutral States, 60 shareholders holding 21,000 shares; in enemy countries, 140 shareholders holding 46,000 shares. Now, under existing conditions, before any scheme offering rights to shareholders, of course excluding enemies, can be carried through, permission has to be obtained from the Imperial Treasury, and from precedents which have come to our notice from time to time this would appear to be a very difficult obstacle during the present state of war. We could not very well offer rights to South African shareholders without giving the same opportunities to subscribe to our British, allied and neutral shareholders. You will, therefore, understand the difficulties which beset your board at the present time. However, all these questions are under consideration by the directors and their financial associates, and it is somewhat unfortunate that we should have to meet you in annual meeting at such a juncture. Now, gentlemen, you can readily understand that the directors are anxious to see your property turned to the best account and the necessary money provided with as little delay as possible. I must, therefore, ask you to have patience and confidence, and I can assure you no opportunity of reopening the mine on an effective basis will be missed. As soon as there is anything of a tangible nature to put before you, which we can recommend, no time will be lost in calling you together and placing the business before you for your consideration. I now move the adoption of the report and accounts before you.

Mr. Fisher seconded the motion.

Confidence in the Property.

Mr. Jones said he was glad that the difficulties with which the directors had

been faced in the matter of raising fresh working capital had been referred to by the chairman, as he was of opinion that these obstacles had not, up to the present, appealed to, or been rightly understood, by the shareholders. He might mention, however, that shareholders in Johannesburg were, to his personal knowledge, looking very anxiously towards the future of the Rand Klip property, and there could be no doubt as to the prospects of the company being good, although the chairman had spoken in such a conservative strain. Shareholders could, however, only speak hopefully in the light of the results obtained on the properties adjacent to Rand Klip, and, though the development on the company's property which had already taken place was poor, still the same experience has been the lot of every company which was now producing successfully on the Far East Rand. He considered that shareholders of the Rand Klip could look forward with some confidence to the future of the company. South Africa was in a good position to-day to put up capital, and other companies had been able to raise capital despite the war—in some cases very large sums. Bearing in mind the prospects of the Rand Klip, and the experience of other companies, it might be possible to raise a large sum in order to proceed with the further development of the property until opportunity arose for reconstructing the company, and it was probable that by that time the board would be able to show shareholders what a very valuable property the Rand Klip was.

Mr. Fernbank said he desired to endorse the remarks of the last speaker. The present he considered was an exceptionally favourable time to put a definite proposition before the Union Government for the raising of additional capital, and, in the event of their approval being obtained, particulars of the scheme should be transmitted to England. He touched briefly on the fact that many of the mines now producing would be worked to a standstill within about eight years, and there was thus all the more need for a mine like the Rand Klip to be put on a producing basis as quickly as possible. He suggested that a deputation wait upon the Government in Pretoria and lay before them a scheme for the issue of debentures. Further, that they should ask the Union Government to use their influence with the Home authorities to secure the necessary permission for raising portion of the capital in the Old Country. Failing the acceptance of this suggestion, he thought the shareholders of the company, and the public of South Africa in general, should have an opportunity afforded them of subscribing the working capital necessary.

Mr. Fisher considered that the figure of £700,000 mentioned by the chairman as necessary to bring the property to the producing stage was somewhat high. He was of opinion that far less than that would be needed, and that a plant to treat 10,000 or 15,000 tons per month would be large enough to start with. If a debenture issue could not be arranged, then he thought it was not impossible that the working capital necessary at this stage for the continuation of development might be secured in this country. On the Stock Exchange the Rand Klip, as he knew, had a very good name, and not being a particularly deep level, always appealed to people. One shaft was down to the reef, and the other was approaching it, and therefore the company was in a far better position than, say, that of the areas held by the Government. While admitting that the directors had done their best thus far, he hoped they would make a strong effort to expedite the business.

The Chairman, in reply to the discussion, said he desired to make it perfectly clear that the Union Government was not in any way placing obstacles in the way of raising capital, but if the shareholders were to have their pro rata of any issue which might be contemplated, then it must be realised that the directors could not overlook equal treat-

ment being meted out to oversea shareholders, and as the Imperial Authorities in London were opposed to the raising of capital in England during the war, it was difficult to know how to overcome the objections placed in the way. He would like to point out, however, that until a considerable amount more development was done, it was, to his mind, very improbable that the security the company was able to offer would be acceptable to would-be lenders either in the form of debenture issues or loans, and it was very dubious whether at this juncture this means of finance would not be prejudicing the security of the shareholders. To his mind the matter required to be dealt with very carefully. As to the proposal that reduction works on a smaller scale than had been contemplated should be erected, he could only say that with a proposition of this kind he could not recommend such a scheme to shareholders, as it would not be on a sufficient scale to ensure profitable working. He expressed the pleasure of the board that the views of shareholders had been so fully and courteously expressed, and it would assist the directors in their efforts to place the company's finances on a basis which would permit of development work being resumed on a comprehensive scale.

The report and accounts were then adopted.

The appointment of Captain J. P. Farrar, D.S.O., as a director, in place of Mr. C. P. Marinis, was confirmed, and as no other nominations to the board had been received, the retiring directors, Mr. J. Andrew Cohen and Captain Farrar, were declared re-elected.

Messrs. Douglas, Low and Company, and Diamond and English were re-appointed auditors, and their remuneration for the past audit fixed at 25 guineas each.

AFRIKANDER PROPRIETARY.

The annual general meeting of shareholders of the Afrikander Proprietary Gold Mines, Ltd., was held on September 27, in the board-room, National Bank Buildings. Mr. Wm. Dalrymple presided, and there were also present Messrs. E. H. Read, J. A. P. Gibb, D. Christopherson, W. J. Gau, J. E. Grievson, and Geo. W. Austin, acting secretary. The total representation was 41,772 shares, out of an issued capital of £89,600.

The Chairman said:—In placing before you, for your consideration, the report of the directors and the accounts for the year ended 30th June, 1916, it is necessary that I should draw your attention to the financial position of the company. You will recollect that in 1914 the capital of the company was reconstructed and sufficient cash was provided to cover the cost of claim licences, etc., etc., for a limited period. The money so provided is now rapidly becoming exhausted. The balance sheet shows that the cash on hand, after allowing for sundry creditors, amounted at the 30th June last to £1,528, and it is estimated that this will be sufficient to pay the current expenses of the company for a further four months from date; in other words until 31st January next. It is evident, therefore, that at an early date the question of further financing the company, if only to enable it to pay claim licences, etc., until the termination of the war, must be considered. Your directors have this in mind and will take all steps necessary to protect the company's interests. As regards the accounts you will see that the net ex-

penditure was £2,020, of which £1,363 was paid out to the Government in respect of claim licences and mynepacht dues. The property is still in the hands of a caretaker. I now move the adoption of the report and accounts before you.

Mr. Christopherson seconded the motion, which was carried.

Messrs. Gau and Robert Niven were re-elected directors.

The auditors, Messrs. Diamond and English, were reappointed.

McCREEDY TIN MINES.

Mr. Harry Graumann presided at the annual meeting on September 25 of the McCreedy Tin Mines (Swaziland). There were also present Messrs. J. H. Ryan, L. K. Jacobs, H. J. Miller, W. Nelson, G. B. Pascoe, E. H. Lamb, A. Barker, W. Just, S. Alexander, H. Williams, and S. B. Dowling (secretary).

In moving the adoption of the report and statement of accounts, the Chairman said:—You have before you, for your consideration and approval, the eighth annual report of the directors, together with the statement of accounts of your company for the financial year ended 30th June, 1916. I may state that nothing calling for special comment has occurred in connection with your company since I addressed you 12 months ago; it will therefore only be necessary for me to briefly touch on the chief points of the reports and accounts. You will notice that the capital of your company and the extent of your property remains the same as reported to you at the last annual meeting, viz., the capital being £25,400 and your property consists of mineral concession No. 30; portion of mineral concession No. 4b; the surface rights over a portion of land concession No. 133 in extent 982 morgen; the whole area being over 1,584 morgen equal to 15 square miles.

Referring to the operations of the company all sluicing and mining work has been exclusively carried out in "A" Creek to which point operations had been transferred from the "Usutu" Creek at the beginning of the period now under review. An average monthly output of slightly over 4½ tons dressed concentrates had been fairly well maintained till the close of the year when your manager reported that a number of intrusive dykes had been encountered and that the ground had become heavily studded with large boulders thus rendering operations difficult. The position having been carefully considered, it was decided upon to shift all the plant and pipe line to a portion of the property known as "C" creek where prospecting had located extensive and payable deposits. This work was carried out and was completed during the months of May and June, and it is not anticipated that any further change in the position of your plant will be required for a considerable period.

115,000 cubic yards of ground were broken and treated, yielding 57 tons 7 cwt. of concentrates dressed to an average assay value of 64.91 per cent. metallic tin. The quantity of ground treated is slightly in excess of last year, but the results obtained are practically the same, the difference being only 5 cwt. over the previous year. The tin market has been very sensitive and uncertain, but notwithstanding the heavy fluctuations in price the average figure of £167 15s. 9d. was obtained, as compared with £164 6s. 9d. for the previous year. Your machinery, plant, and buildings, also your water race, have been maintained in a high state of efficiency; at the same time your board, as in past years, has deemed it advisable to reduce book values, and the sum of £108 odd has been written off for depreciation of plant and buildings.

Farming operations have again failed to come up to expectations, entirely due to a most unpropitious season; 200 acres were ploughed and planted with mealies, which in the ordinary course of events should have produced at least 1,000 bags, but owing to very severe hailstorms during the growing season, followed by a long drought, the crop was in many places completely destroyed, and only 400 bags of mealies were recovered.

Turning to the financial position, you will observe that the total revenue derived from concentrates won amounted to £6,579 0s. 3d.; working costs, including realisation and export charges, amounted to £5,511 8s. 5d.; leaving a net working profit for the year of £1,067 11s. 10d.

This is a substantial increase on last year's profit, and your directors are hopeful that the current year will show improved results.

The report was adopted without discussion.

The retiring directors, Messrs. Graumann and J. Jeppe, were re-elected, and Messrs. F. W. Diamond and English were reappointed auditors.

CHAMBER OF MINES.

The President of the Chamber of Mines, Mr. E. A. Wallers, dealt with important matters affecting the mining industry at the quarterly meeting of the Chamber on Monday.

The President said. Gentlemen:—Very important matters in connection with the wages and hours of mine employees have occupied much of our attention recently, and you will be aware that agreements have been completed in regard to the conditions generally of employment of certificated winding engine-drivers and the mechanics on the mines. Both of these agreements involved much discussion between the unions in question and ourselves, and I feel you will agree that the industry has met the requests of the men in a manner that is certainly fair-minded, and, indeed, generous in some directions. I feel sure, however, that we shall have no reason to regret in the future any of the concessions that we have made. The principle of meeting the duly accredited representatives of the men's unions which was adopted by the Chamber some 18 months ago certainly facilitates the presentation to the mining industry of the employees' requests, and involves a great deal of work in the shape of industrial conferences. The importance of the work, however, cannot be overestimated, and I am certain that the readiness evinced by the Chamber to discuss any reasonable grievances put forward by the representatives of the employees must have the best of results on the relationship between the employer and employee and that the confidence and good feeling thus engendered will prove a most valuable asset to the mining industry.

The South African Mine Workers' Union has presented to the Chamber a number of demands on behalf of the underground workers. In connection with the majority of these demands information is being obtained from the mines to enable them to be discussed with the representatives of the union. With regard, however, to the suggestion that the number of working hours of underground employees should be reduced, your Executive Committee has informed the union that the Chamber is definitely opposed to any further reduction of these hours, which are, indeed, laid down by Act of Parliament. You are no doubt aware that under the Mining Regulations a considerable amount of time is absorbed

at the beginning and end of each shift in carrying out work which cannot be performed by the natives, such as the examination of working places, marking tickets, charging up, and so on. It will be clear that the effect of this would be to shorten appreciably the number of possible working hours of the natives themselves; and, indeed, in some cases of the eight hours at the face, which is the maximum permitted by law, from three to four hours are taken up in such duties. Thus only four to five hours actual working time remains for the natives, and any further reduction in this already short working time would have a very serious effect on the industry. Your Executive Committee, therefore, being definitely opposed to any such reduction, has considered it right to inform the Union to that effect, and so remove any possible misapprehension on the subject.

War Bonus Scheme.

The extension of the Chamber's War Bonus Scheme which has been adopted is a natural sequence of the further increase in cost of living that has taken place recently—the total increase is now calculated at 13 per cent. The scale of bonus adopted is in accordance with the view of the Chamber, when this matter was originally discussed rather more than 12 months ago, namely, that the less highly paid employees, who have a smaller margin of wages out of which to meet the increase in the cost of living, should receive the largest bonus. After a certain figure has been reached (laid down at £27 10s. per month) the employee must be considered, in view of the margin between wages and cost of living that exists here in normal times, as able and willing to bear himself the increase in the cost that has taken place. In considering the question of a war bonus to employees of the gold mines it will, I am sure, always be remembered that it does not in any way correspond to the war bonuses granted in various trades in the United Kingdom. The latter are to a very large extent the means by which the employees participate in the extra war profits of their employers. In the gold mining industry these extra profits cannot exist, and indeed, as you know, as far as we are concerned, the additional heavy costs of production which are being borne by this industry cannot even be passed on to the consumer.

Miners' Phthisis Act.

As regards the new Miners' Phthisis Act the necessary organisations, viz., the Miners' Phthisis Board and the Miners' Phthisis Medical Bureau, have been established by Government, and we are doing everything possible to facilitate the work. We have laid down the procedure necessary under the Act that has to be followed by the mines in regard to the medical examination of natives coming forward for underground work for the first time. The procedure adopted adheres as closely as possible to the routine followed on the mines in the past for such examinations, giving due effect to new requirements under the Act. An important arrangement was agreed to at the request of the Medical Bureau, under which a depot of the Bureau has been established at the compound of the Witwatersrand Native Labour Association, to which depot all natives thought to be suffering from miners' phthisis are sent for examination by the medical officer of the Bureau. Opportunity is taken, at the same time, to pay out any compensation due to these natives, the association making the necessary payments to them on behalf of its members. The extent to which this arrangement will facilitate the work of the Medical Bureau, and also avoid delays in the payment of compensation, is great.

You will remember that in the Act provision is made for the payment of compensation for tuberculosis to native employees as well as to white employees during the period 1st August, 1916, to 31st July, 1917. It was never intended that compensation for tuberculosis should be paid to individuals who have not been at work on the mines during that period. The wording of the clause in the Act is,

however, not as clear as might be desired, and the Native Affairs Department has in certain instances assessed compensation upon mines in respect of natives now affected with tuberculosis who have not worked on the mines subsequent to the 1st August, 1916. It is clear that if such were the meaning of the Act a very serious retrospective liability which was never contemplated by the industry, nor I am sure by the Legislature, would be imposed on the mines. Your executive committee has therefore objected to the assessments in question, and has taken up the matter with the Native Affairs Department.

Medical Examination.

The periodical medical examination of European mine employees necessary under the Act is in operation, and in order to assist the Bureau in securing the attendance of such employees for examination the gold mines associated in this Chamber have agreed to pay such employees for the working time lost by them in attending at the Bureau, payment being made at a maximum rate of 20s. a shift. Under this arrangement also employees who are detained at the Bureau for observation will continue to receive pay during the few days they are so detained. It would be well, I think, to add here a word or two as to the reason underlying this periodical medical examination, because there would appear to be a little misapprehension in the minds of the men themselves. It is solely for the purpose of eliminating from underground work a man suffering from tuberculosis of the lungs, and no other individual than that will be prevented from continuing his occupation. No official statement has yet been issued by the Bureau of the results of its work to date, but I am at liberty to acquaint you with one extremely gratifying feature of which I know that has resulted from the periodical medical examination of all European mine employees up to the present. It is this that, from the evidence so far obtained, happily very few men need fear they will be prevented from continuing their present occupation; in other words, the examination of the men at present working, as far as it has gone, discloses the fact that extremely few of them are in a state of health necessitating their giving up their present work. That evidence you will agree, gentlemen, is exceedingly satisfactory, primarily for the men concerned, and secondly for ourselves. As you will know, the Miners' Phthisis Select Committee of the House of Assembly recommended that separate accommodation should be provided in our sanatorium for men who are unfortunately suffering from tuberculosis or tuberculosis plus miners' phthisis or silicosis. The reasons underlying this recommendation will be clear to you, and although as I have indicated, and as I sincerely trust will be substantiated as the work proceeds, the evidence so far indicates that few men will be found suffering from tuberculosis, yet your Executive Committee has approached the Government, and stated that it is willing to carry out the recommendation of the Select Committee. We are prepared to contribute one half of the cost of building a separate institution for the accommodation of persons suffering from silicosis only, and to contribute one half of the cost of maintenance of such an institution if the Government, as recommended by the Select Committee, will bear the remainder of the capital cost and the balance of the maintenance. The Government's reply to this suggestion has not yet been received, but I feel confident that it will be favourable. The carrying out of this project will leave our present sanatorium free for the treatment and alleviation of the suffering of those men to whom I have referred.

It is known to you that men suffering from silicosis who have withdrawn from underground work have, after a period of abstention from that work, happily become quite fit for other employment. We have therefore been considering the de-

tails for the establishment of a Bureau under the aegis of the Association of Mine Managers for the employment of silicotic men on the surface of the gold mines in suitable branches of the work. We have now perfected our arrangements, and I hope that the Bureau will be in operation at the beginning of October, and I feel sure will in course of time be responsible for the placing of a large number of silicotic men in suitable surface employment.

Elimination of Dust.

The increased interest in the question of the elimination of dust from mine air, brought about largely through the dust sampling work undertaken by the Chamber, continues to be maintained, and, as mentioned in the report of the Executive Committee, each mine has appointed a dust sampler of its own, who spends the major portion of his time in taking dust samples on the mine for analysis and record in the Chamber's laboratory. The lectures for mine dust samplers and to stimulate interest in the subject generally that have been arranged by the Chamber are being well attended, and will, I am sure, prove very valuable. Finally, I think, gentlemen, that the Chamber's Standing Committee on Dust Sampling calls for our congratulations and our keen appreciation of the manner in which it has fostered interest in the elimination of dust amongst mine officials, as well as the new ideas that it has continued to bring forward to that end.

Apprentices on Mines.

You will have observed from the report that the Executive Committee has under consideration steps for increasing the facilities for the training of youths for service on the gold mines. Even now, when the industry has been in existence for 30 years, the extent to which it trains boys for its employment is comparatively small, and probably no other industry of the same age and importance depends so largely upon the influx of employees who have obtained their training at other centres. The fact is the more curious owing to the admitted scarcity of suitable avenues of employment for the South African youth. The prevalence of miners' phthisis in the past has no doubt militated against the popularity of mining as an avenue of employment for the rising generation. The knowledge of such prevalence is no doubt more general than is the knowledge of the steps that are being taken and the success obtained in eradicating the disease. The result has been that, so far as underground employees are concerned, the great majority of the local recruits consists of adults, who may have in some instances failed in other walks of life, and who in any case usually do not look upon mining as a permanent occupation, but rather as a means of tiding over a temporary difficulty. It is certain that this is a subject of first-class importance, and, both from the point of view of the country and the efficiency of the industry, it is essential that a properly thought out scheme for encouraging the apprenticeship of South African youths to mining and to trades on the mines should be evolved without delay. I am sure that the assistance of the Government will be at once forthcoming because to them the problem of providing avenues of useful employment for the youth of the country must surely be a matter of great moment. In our view the extension of the existing Trades School system should be aimed at for the training of lads to the various trades, and that as regards miners similar Mines Training Schools to that existing now on the Wolvlei Mine should be established along the Reef under the joint control of the Government and the industry, who would each participate in the cost. Representations are being made to the Government with a view to suggestions on these lines being carried out.

Employees on Active Service.

The number of mine employees on active service with the permission of their em-

ployers from the Witwatersrand gold mines members of the Chamber was, at 30th June, 1916, no fewer than 3,400. When it is remembered that a large proportion of the employees of the gold mines (approximately 60 per cent.) consists of skilled workers who cannot be replaced except by other skilled workers the figure is, to my mind, a remarkable one. An examination of the proportions of each class of employee on active service is exceedingly interesting, proving that those classes that can be replaced most easily have been granted permission to volunteer in the greatest numbers. For example, the number of apprentices on active service is 92 per cent. of the number now at work, the number of amalgamators' assistants is 58 per cent., amalgamators 35 per cent., clerical staff 28 per cent., cyaniders and cyanide assistants 87 per cent., shiftsmen and shiftmen's assistants (reduction works) 49 per cent., slime-men 38 per cent., switchboard attendants 35 per cent., tube mill hands 42 per cent., winch drivers 26 per cent. Your Executive Committee has asked the mines to use every endeavour to allow still more men to volunteer if at all possible, but in view of the large number who have already gone, and the impossibility of obtaining efficient substitutes, I fear that extremely few will be able to go, always assuming (as I think we must all assume) that it is necessary in the interests of the Empire to maintain the industry at its full capacity. It is possible, however, that as invalided soldiers return from German East Africa they may be able to take the places of eligible men still at work on the mines, and this possibility is being borne in mind by the various groups.

I much regret to state that one of the Chamber's dust samplers, Mr. A. Hasler,

who obtained a commission in the Grenadier Guards, is reported as having died of wounds in France. Mr. Hasler was one of the original dust-sampling staff of the Chamber, and was a most promising official.

Daylight Saving.

An interesting innovation is touched upon in the report of the Executive Committee, namely, the alteration in the office hours of the town offices of the mining houses during the summer months, so that these offices will open at 8 and close at 4. As you are aware, the principle of "daylight saving" has been adopted in England and in a number of the Colonies, Government action being taken, and the clock put forward one hour during the summer. This is, of course, the ideal method of arriving at the object aimed at, and your Chamber, in common with many other bodies in the country, has approached the Government with a view to a similar alteration being made throughout the Union. It appears, however, that legislation may be necessary to give effect to such an alteration, and consequently, should the Government agree to the representations, it will still be unable to bring them into force for some months. It appears to your Executive Committee that it would be possible to attain many of the advantages that would follow the alteration of the clock, by simply altering the working hours during the summer. It is hoped that other public bodies and commercial houses on the Rand will follow suit, when an endeavour would be made to obtain an alteration in the hours of the theatres and other places of amusement. Although this alteration will, if

adopted fairly generally, secure for the Rand immediately many of the practical advantages of a Daylight Saving Act, yet your Executive Committee trusts that the Government will at the earliest possible date pass such an Act. The undoubtedly benefit of the alteration to the inhabitants of other countries would be particularly striking in the case of the Witwatersrand, owing to the very limited time available for recreation after working hours even in the summer, and in the case of underground employees especially, the necessity of as much open-air recreation as possible is obvious.

You will have shared our deep regret in hearing of the death which occurred so suddenly the other day of Sir Sigismund Neumann, who personally and through his firm here was so closely and strongly identified with the development of this industry. Our sympathy is with Lady Neumann and her children in the great loss they have sustained. I now beg to move the adoption of the report of the Executive Committee for the three months ended 31st August, 1916.

Those present at the meeting were Messrs. E. A. Wallers, President; A. French S. C. Black, H. C. Boyd, R. M. Connolly, C. Distel, P. Dreyfus, W. T. Graham, A. Gregor, F. Raleigh, H. A. Rogers, V. J. Ronketti, W. Ross, D. W. Rossiter, W. S. Smits, A. J. Wright, H. W. Anderson, A. A. Auret, W. Dalrymple, S. Evans, G. Falcke, G. C. Fitzpatrick, W. H. B. Frank, A. G. Gill, M. Hornet, C. Hely-Hutchinson, G. Imroth, J. Jeppe, J. Jourdan, A. F. Lyall, F. R. Lynch, H. O. Mascall, C. Meintjes, A. F. Mullins, J. Munro H. Newhouse, H. G. L. Panchaud, A. S. Pearse, E. J. Renaud, P. Richardson, J. F. Rutherford and S. C. Steil.



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REVIEW.

"Principles of Oil and Gas Production," by Roswell H. Johnson and L. G. Huntley. Published by John Wiley & Sons, Inc., New York; and Chapman & Hall, Ltd., London. 371 pp. Cloth. Price 16s. net.

With the exception of Mr. E. H. Cunningham Craig's excellent little book on "Oil Finding," most other general works upon the subject are more or less out-of-date, or are devoted to special aspects of the subject. During the last dozen years, or less, a considerable petroleum literature has accumulated in the shape of official bulletins and contributions to the transactions of scientific societies, not only in the department of geology and chemistry but on the economical side as well. In order to keep pace with present day views and knowledge the authors of this book, Messrs. Roswell H. Johnson, Professor of Oil and Gas Production, and L. G. Huntley, Lecturer on Foreign Oil and Gas Fields, at the University of Pittsburg, have prepared a treatise that deals at some length with the newer, less developed topics of their subject, leaving on one side those that have a more extensive literature, to which, however, ample references are made. The work treats mainly of American conditions, but these are so wide, of course, that a great deal of the discussion must necessarily have considerable bearing on conditions that prevail in other fields, both in Europe and elsewhere. In order to give an idea of the scope of the book, it may be mentioned that the varieties, origin and distribution of oil and gas are dealt with concisely at the commencement, followed by important chapters on the reservoirs of oil and gas, and the peculiar methods of segregation of these substances as dependant upon the physical character and structure of the containing rocks. Pressure, origin of the shape of the reservoir, classification of the attitude of geologic surfaces and the effect of these different attitudes upon accumulation, are subjects that are discussed in the light of the most recent theories and teachings. The locating of oil and gas wells is a particularly interesting chapter. Following upon this we have a good deal of instructive information with regard to the drilling and the various mechanical operations associated with the work of bringing in wells and the management of oil and gas yields. The natural gas industry, size and scope of oil and gas companies, reports and valuations, and finally a review of the oil and gas fields of North America and a consideration of the oil market and future sources of supply, are topics that complete a volume that will be found most useful, in many ways, to those who are interested in the conditions and progress of one of the world's greatest industries.

S.-W. TRANSVAAL DIAMONDS
AUGUST RETURNS.

The diamond returns for the South-Western Transvaal for the month of August show that the monthly average of finds for the six months has been well maintained, the figures for this year having been as follows:—

	Carats.	Value.
January	2,486 $\frac{1}{4}$	£11,818 7 0
February	3,603 $\frac{3}{4}$	20,970 10 6
March	1,041	20,632 16 0
April	3,502 $\frac{3}{4}$	18,465 0 0
May	3,877 $\frac{1}{2}$	20,141 15 6
June	3,461 $\frac{1}{4}$	20,822 6 6
July	3,261	19,533 5 0
August	3,552	20,387 2 6

Fifty-two areas in all contributed to the output, and of these the more important were as under:—

	Carats.	Value.
London	554 $\frac{1}{4}$	£3,372 7 6
Bloemhof	446 $\frac{3}{4}$	2,764 5 0
Dieveldraai	463 $\frac{1}{2}$	2,687 15 0
Rietput	345 $\frac{1}{2}$	2,152 5 0
Christiana	154 $\frac{1}{2}$	1,114 10 0
Plessisdam	178	971 10 0
Krommelenboog	118 $\frac{1}{2}$	818 7 6
Kareepan 137	139 $\frac{1}{2}$	648 0 0
Koppiesvlei	120	552 15 0
Kameelkuil	94 $\frac{3}{4}$	543 10 0
Cawood's Hope	97 $\frac{1}{4}$	507 2 6
Klipkuil	103 $\frac{1}{2}$	494 0 0
Blesbokfontein	90 $\frac{1}{2}$	468 17 6
Diamantdoorns	52 $\frac{3}{4}$	331 0 0
Mimosa	58 $\frac{1}{2}$	300 10 0
Eastleigh	66 $\frac{1}{2}$	289 10 0

The Board of Trade.

In reply to a question in Parliament by Sir E. Cornwall, Mr. Asquith said that active steps were being taken with a view to placing the Board of Trade in a position to deal effectively with post-war economic and commercial problems, but he was not now in a position to go into details. In regard to a Minister of Commerce, no good object would be attained by the multiplication of Ministers.

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The Simmer and Jack Proprietary Mines, Limited.

(Incorporated in the Transvaal.)

REPORT OF THE DIRECTORS

For the Year ended 30th June, 1916.

Submitted at the Eighteenth Ordinary General Meeting of Shareholders, held in the Board Room, Consolidated Gold Fields Buildings, Simmonds Street, Johannesburg, on Friday, 22nd September, 1916, at 11.30 o'clock in the forenoon.

Gentlemen,—Your Directors beg to submit their Report, together with the audited accounts, for the year ended 30th June, 1916.

CAPITAL.

The Capital of the Company, which is unchanged, consists of £3,000,000 in 3,000,000 shares of £1 each, all of which have been issued, fully paid.

PROPERTY.

The area of your Mining Property, in which claim licences and mynpacht dues are paid, is equal to a claim area of 624.270 claims, which is the same as last year. The claims are held as to 425.086 under claim licences and 199.184 under mynpacht title, and are situated on the farm Elandsfontein No. 11.

Of the above claims held under mynpacht title, the New Primrose Gold Mining Company, Ltd., have the lease of 3.428 claims for mining purposes and the surface rights of 11.599 claims. Of the total number of claims 246.07, however, lie to the north of the outcrop.

It is estimated by the Superintending Engineer that the intact claim area at 30th June, 1915, was equal to 110.637 claims, of which 25.817 claims are in dyke, leaving an intact reef bearing area equal to 84.820 claims, in addition to which a large tonnage of ore is available as reclamation from areas already stoped out.

Your Company also owns seven machine stands (five of which are leased to The Victoria Falls and Transvaal Power Company, Limited); four diggers' stands, all of which were under lease; and seven water-rights, six of which are situated on the farm Elandsfontein, No. 11, and one on the farm Driefontein, No. 1.

In addition to the above, your Company holds the right, under a lease from the Rand Mines, Limited, to the water in the water-right on Elandsfontein No. 6, forming a portion of the Victoria Lake.

The area of your Company's freehold title, which consists of a portion of the farm Elandsfontein No. 11, comprises 1,264 morgen 231 square roods 20 square feet. Of this area, a portion 142 morgen 468 square roods 6 square feet in extent, has been laid out into the following Townships: Germiston and North Germiston (which are owned in their entirety by the Company), East Germiston, West Germiston, Germiston Extension, and a portion of South Germiston (in which Townships the Company holds a two-thirds interest) and the Company's portion of the Primrose Township, leaving the area of the Company's freehold (exclusive of the freehold area undisposed of in the Townships, which is shown below) at 30th June, 1916, at 1,121 morgen 363 square roods, 14 square feet.

The freehold ground in the above Townships still available for disposal at 30th June, 1916, was equal to an area of 49 morgen 535 square roods 89 square feet, arrived at as follows:

	Morgen.	Sq. roods.	Sq.ft.
Total area	142	468	6
<i>Less:</i> Area covered by streets, lanes, open spaces, parks and railway expropriations	53	266	18
	89	201	132
<i>Less:</i> Area of freehold lots disposed of	39	266	43
Leaving an area still available for disposal of	49	535	89

The number of stands unsold in the Townships at 30th June, 1916, was as follows:—Germiston Township, 131; North Germiston Township, 34; East Germiston Township, 8; West Germiston Township, 6; Germiston Extension Township, 5; South Germiston Township, 48; and Primrose Township, 43.

The Simmer and Jack Proprietary Mines, Limited.—continued.

The Property Account in the Balance Sheet has been sub-divided to show under the heading of Interests in Townships the estimated value of your Company's interest in the unsold freehold of all the above stands. A separate heading "Buildings in Townships" shows the book value of buildings in these Townships belonging to your Company (viz., 26 Cottages, the Germiston Estate House and Offices, and the buildings on Stands 161-2-3, Germiston Township), leaving under the remaining heading, "Mynpacht and Claim Areas, Water-rights and Freehold," the book value attaching to your Company's mining titles and of its freehold ownership other than in the Townships mentioned.

OPERATIONS.

The Superintending Engineer's and Manager's Reports, which are attached, give a resume of the operations conducted at the mine during the period under review.

ACCOUNTS.

The working profit for the year, after allowing for the expenditure of £11,480 19s. 2d. on renewals and replacements of machinery, plant, etc., amounted to	... 287,183 18 7
Add: Sundry Revenue	... 29,554 0 3
	316,737 18 10
<i>Deduct:</i> Contributions to the Miners' Phthisis Compensation Fund; estimated Special War Levy, Profits Tax and South African Income Tax for the year; expenditure due to the War and sundry amounts written off	... 45,799 0 9
Making a total credit to Appropriation Account	270,938 18 1
Add: Balance at credit of Appropriation Account at 30th June, 1915	... 78,876 4 5
From this amount there was appropriated:—	
For Dividends Nos. 27 and 28 of 5 per cent and 3½ per cent, respectively, declared during the year	£262,500 0 0
For reserve for machinery, additions and renewals	6,562 10 0
	269,062 10 0
<i>Less:</i> Expended on renewals and replacements and charged to working costs	11,480 19 2
	257,581 10 10
Leaving a credit balance to Appropriation Account at 30th June, 1916 of	... £92,233 11 8

CAPITAL EXPENDITURE.

The amount expended during the year on equipment of property, including shaft sinking, was £5,103 8s. 16d.

INVESTMENTS.

Your investments and interests in other concerns, which stood in the books at 30th June, 1915, at £26,247 2s. 9d., now stand at £17,735 16s. 8d.

During the year 19,000 shares in the Simmer Deep and 14,000 Victoria Falls 6 per cent. Preference shares have been sold at prices considerably in excess of their book values, and the usual adjustments have taken place in your Company's interests in the Witwatersrand Co-operative Smelting Works, Limited, Rand Mutual Assurance Company, Limited, and the Native Recruiting Corporation, Limited. A list of investments is shown in the Balance Sheet.

Your Company also holds 40,409 fully paid 6 per cent. Preference shares of £1 each of The Victoria Falls and Transvaal Power Company, Limited, which are earmarked as an investment for the purposes of the Additions and Renewals Fund.

Of the shares shown under this heading in last year's report, 4,625 have been sold and the remainder have been somewhat written down out of the book profit earned on the sale of the 14,000 Victoria Falls 6 per cent. Preference shares mentioned at the beginning of this paragraph.

DIRECTORATE.

You will be asked to elect two Directors in the places of Messrs. C. H. Barclay and W. S. Smits, who retire by rotation, but being eligible, offer themselves for re-election.

AUDITORS.

It will be necessary to fix the remuneration for the past year's audit and to elect two Auditors in the places of Messrs. Douglas, Low and Co. and Mr. T. A. White, who retire in accordance with the provisions of the Articles of Association, but are eligible and offer themselves for re-election.

GENERAL.

Mr. O. P. Powell has continued to act as your Company's Manager during the year, and your Directors desire to record their appreciation of the services rendered by him and his staff.

D. CHRISTOPHERSON, Chairman,

C. BELY-HUTCHINSON,
Directors.

THE CONSOLIDATED GOLD FIELDS OF S.A., LTD.,
Secretaries.

per A. C. GRANT

Johannesburg, 13th September, 1916.

BALANCE SHEET at 30th June, 1916.

Dr.	Cr.
To Capital Account	£3,000,000 0 0
3,000,000 Shares of £1 each, all of which are issued.	
.. Reserve Account	632,937 5 5
Balance at 30th June, 1915	£630,741 17 9
Add—Amount realised on sale of Simmer Deep Shares during the year	2,195 7 8
.. Amount appropriated for Capital Expenditure	339,691 12 2
Balance at 30th June, 1915	335,909 19 6
Add—Additional Capital Expenditure during the year transferred from Additions & Renewals Fund	3,781 12 8
.. Fund for Additions to and Renewals of Machinery and Plant—1915	£67,729 4 0
Add—Further appropriation	6,562 10 0
	74,291 14 0
Carried forward	£3,972,628 17 7
Carried forward	£2,544,231 3 3
By Property Account (at cost, less sundry credits)	£2,544,231 3 3
Mynpacht, Claim Areas, Water-rights and Freehold	£2,487,948 18 3
Estimated value of the Company's interests in the following Townships: Germiston, West Germiston, North Germiston, East Germiston, South Germiston, Germiston Extension and Primoise	£48,677 0 0
Add—Further stands taken over in Germiston	1,197 5 0
	49,874 5 0
Less—Net realization of sale of stands during the year	4,727 18 11
	45,146 6 1
Buildings on Townships	11,135 18 11

The Simmer and Jack Proprietary Mines, Limited.—continued.

Balance Sheet at 30th June, 1916.—continued.

Dr.	Brought forward	£3,972,628 17 5	Cr.	Brought forward	£2,544,231 3 3
Less — Charged to Working Expenditure and Revenue Account 11,480 19 2			,, Expenditure to date on equipment of Property—less amounts written off 1,412,946 5 8		
Amounts written off for Additions during the year 3,781 12 8	15,262 11 10	5,583 6 8	Shaft sinking 244,293 6 2		
,, Reserve Gold			Buildings 162,042 19 0		
,, Reserve for redemption of Germiston Cottages and Simmer and Jack Hospital (Buildings and Furniture) 8,519 0 9	189,712 14 0	189,712 14 0	Machinery and Plant 906,807 17 2		
,, Sundry Creditors			Water Service 80,356 2 11		
Open Accounts for Wages, Stores, and Sundries 45,167 8 10			Simmer and Jack Hospital (Buildings and Furniture) 16,809 9 9		
Sundry Shareholders' Dividend No. 28 of 3½ per cent. 112,500 0 0			Swimming Bath 1,160 10 5		
Government of the Union of South Africa—Profits Tax, Income Tax, and Special War Levy 32,045 5 2		33,815 3 9	Simmer Railway Siding 1,086 9 0		
,, Dividends Unclaimed, per contra ...		92,233 11 8	Metallurgical Laboratory 80 0 0		
,, Balance from Appropriation Account			Simmer and Jack Mess Equipment 309 11 3		
 Contingent Liabilities—					
Balance payable on uncompleted Contracts 5,152 12 6			,, Livestock, Vehicles and Harness 143 2 0		
Amounts due on Import Orders ... 32,088 14 5			,, Motor Cars and Lorry 385 3 9		
Amounts uncalled on Shares held— £4 per share on 231 Rand Mutual Assurance Co., Ltd. shares ... 924 0 0			,, Office and other Furniture 886 4 6		
12s. per share on 2,034 Witwatersrand Co-operative Smelting Works, Ltd., shares ... 1,220 8 0			,, Stores and Materials on hand, including Machinery not erected ...		
8s. per share on 862 Witwatersrand Native Labour Association, Ltd., shares 344 16 0			,, Payments in advance 66,632 17 9		
Native Recruiting Corporation, Ltd., Deposit Account—10s. per native uncalled on complement of 4,644 natives ... 2,322 0 0		33,815 3 9	10,951 13 1		
	£42,052 10 11		2,329 0 10		
			8,622 12 3		
			,, Investments and Interests in other concerns (at or under cost) ... 17,735 16 8		
			40,516 4 16 Simmer Deep, Ltd., Shares of £1 each, fully paid		
			2,034 Witwatersrand Co-operative Smelting Works, Ltd., Shares of £1 each, 8s paid		
			8,500 Victoria Falls and Transvaal Power Co., Ltd., Ordinary Shares of £1 each, fully paid		
			862 Witwatersrand Native Labour Association Shares, of £1 each, 12s. paid		
			231 Rand Mutual Assurance Co., Ltd., Shares of £10 each, £6 per share paid	15,413 16 8	
			8,950 Breyten Collieries, Ltd., Shares of £1 each, fully paid		
			46 Native Recruiting Corporation, Ltd., Shares of £1 each, fully paid		
			Native Recruiting Corporation, Ltd.—deposit of 10s. each on the total complement of 4,644 natives, being part of total liability, under agreement, of £1 per native 2,322 0 0		
			,, Investment of Reserve Fund for Additions to and Renewals of Machinery and Plant 55,329 4 4		
			40,409 Victoria Falls and Transvaal Power Co., Ltd., Preference Shares of £1 each, fully paid		
			,, Sundry Debtors 16,562 7 6		
			,, Gold in transit 30,290 9 0		
			,, Cash at Bankers, London and Johannesburg 33,815 3 9		
			For Dividends unclaimed, per contra ...		
			,, Cash 191,612 5 4		
			On fixed deposit, and at Bankers, London, Johannesburg, Germiston and on hand at mine.		
		£4,361,521 16 7		£4,361,521 16 7	

The Consolidated Gold Fields of South Africa, Ltd., Secretaries.

Per A. C. GRANT

To the Shareholders of

The Simmer and Jack Proprietary Mines, Limited.

We report that we have examined the above Balance Sheet with the books and vouchers of the Company in Johannesburg for the year ended 30th June, 1916, in which have been incorporated the audited Accounts received from London, and have obtained all the information and explanations we have required as Auditors. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs according to the best of our information and the explanations given to us, and as shown by the books of the Company.

D. CHRISTOPHERSON,
(Chairman),
C. HELEY-HUTCHINSON,
Directors.

T. A. WHITE,

DOUGLAS, LOW & CO., Auditors
(Incorporated Accountants),

Johannesburg, 9th September, 1916.

The Simmer and Jack Proprietary Mines, Limited.—continued.

WORKING EXPENDITURE AND REVENUE ACCOUNT for Year ended 30th June, 1916.

Dr.	Cr.
To Mining Expenses ...	£391,388 9 1
Mining & Pumping £361,860 6 8	
Development ... 29,528 2 5	
,, Reduction Expenses.	140,402 10 2
Sorting, Crushing and Transport of of Quartz... 17,271 4 5	
Milling Expenses ... 36,028 4 9	
Tube Milling Expenses ... 23,163 16 11	
Sand Expenses ... 35,448 11 1	
Slime Expenses ... 28,485 13 0	
,, General Expenses—Mine ...	34,494 9 11
,, Expenditure on Renewals and Replacements of Machinery, Plant, Buildings, etc. ...	11,480 19 2
,, Head, London, and Paris Offices Expenses ...	10,200 11 10
,, Balance, being Profit on Working carried down ...	287,183 18 7
	<u>£875,150 18 9</u>
To Miners' Phthisis Compensation Fund Levies under Miners' Phthisis Act for year ended June 30, 1916.	£4,717 0 2
,, Sundry amounts written off ...	263 9 0
,, Expenditure due to war ...	7,858 4 3
,, Dismantling Buildings ...	48 3 8
,, Profits Tax ...	32,274 9 1
Provision for the year ended June 30, 1916, £20,855 6s.; add: Amount under-estimated for the year ended June 30, 1915, 4s.	20,855 10 0
Provision for Special War Levy in terms of Act 24 of 1915, £10,427 17s.; add: Amount under-estimated for the year ended June 30, 1915, £991 2s 1d.	11,418 19 1
,, South African Income Tax ...	637 14 7
Provision for the year ended June 30th 1916... ...	762 2 2
Less—Amount over-estimated for the year ended June 30, 1915 ...	124 7 7
	<u>45,799 0 9</u>
,, Balance carried to Appropriation Account ...	270,938 18 1
	<u>£316,737 18 10</u>
By Balance brought down ...	£287,183 18 7
,, Elandsfontein Revenue ...	£10,638 8 8
,, Interest Commission and Exchange	4,770 6 11
,, Rents received, less maintenance...	1,525 2 3
,, Sale of Water ...	2,543 17 11
,, Dividends on Investments ...	4,703 11 2
,, Transfer Fees ...	81 10 0
,, Sundry Revenue ...	5,291 3 4
	<u>29,554 0 3</u>

APPROPRIATION ACCOUNT.

Dr.	Cr.
To Dividends ...	£262,500 0 0
Dividend No. 27 of 5 per cent., declared 14th December, 1915 ... £150,000 0 0	
Dividend No. 28 of 3½ per cent., declared 28th June, 1916 ... 112,500 0 0	
,, Balance carried to Balance Sheet ...	92,233 11 8
	<u>£354,733 11 8</u>
By Balance at June 30, 1915 ...	£78,876 4 5
,, Balance brought from Working Expenditure and Revenue Account for year ended June 30, 1916 ...	270,938 18 1
,, Amount transferred from Fund for Additions to and Renewals of Machinery and Plant, to cover the sum expended on Renewals and Replacements charged to Working Expenditure and Revenue Account in excess of the total sum voted for Addition and Renewals during the year, viz.: Expenditure on Renewals and Replacements ...	11,480 19 2
Less—Amount voted: 5 per cent. of Dividends Nos. 27 and 28	6,562 10 0
	<u>4,918 9 2</u>
	<u>£354,733 11 8</u>

THE SUB NIGEL, LIMITED.

(Incorporated in the Transvaal.)

REPORT OF THE DIRECTORS

For the Year ended 30th June, 1916.

Submitted at the Eighteenth Ordinary General Meeting of Shareholders, held in the Board Room, Consolidated Gold Fields Buildings, Simmonds Street, Johannesburg, on Friday, 22nd September, 1916, at 10.45 o'clock in the forenoon.

Gentlemen.—Your Directors beg to submit their Report, together with the audited Accounts, for the year ended 30th June, 1916.

CAPITAL.

The Capital of the Company, which is unchanged, consists of £475,000, in 475,000 shares of £1 each, of which 431,580 shares have been issued fully paid, leaving 43,420 shares held in reserve.

PROPERTY.

The area of your mining property, on which claim licences are paid, is equal to an area of 1,494,2860 claims, which is the same as last year. These claims are situated on the farms Varkensfontein, No. 217, Droogebult, No. 350 and Noycedale No. 71, all situated in the Heidelberg District.

Your Company also holds six water-rights (of which four are situated on the farm Bultfontein, one on farm Noycedale and one on farm Varkensfontein), one machine stand, and a 17.39 per cent. interest in the following claims and water-rights taken over from the Central Nigel Deep, Limited (in Liquidation):—

- (a) 15.957 claims on the farm Varkensfontein No. 217, and
- (b) Two water-rights on the farms Varkensfontein and Bultfontein.

In addition your Company holds the freehold of a part of the unproclaimed portion of the farm Bultfontein, in extent 608 morgen 283 square rods.

Since the close of the financial year your Directors have arranged for the purchase of 383,8416 claims adjoining the Company's northern and north-eastern boundaries. The owners of the claims (to which are attached two water rights) are to receive 43,420 £1 shares of this company.

These shares are, however, not deliverable until 1st July, 1917, and do not participate in any dividends declared in respect of any period prior to that date.

OPERATIONS

The Reports of the Superintending Engineer and Manager, which are attached, give a resume of the operations carried out at the mine during the period under review.

ACCOUNTS

During the year under review the profits as shown in the Income and Expenditure Account, after making provision for the expenditure of £2,915 9s. 11d. on renewals and replacements of machinery, plant, etc., amounted to £32,759 3 11. Add: Sundry Revenue, Interest, etc. 2,637 11 1

Making a gross profit of £35,396 15 0

Less: Contributions to Miners' Pensions Compensation Fund, provision for South African Income Tax; estimated additional charges on gold lodged prior to September, 1915, but not yet realised, expenditure due to war; and sundry amounts written off 2,680 18 5

leaving a net profit of £32,715 16 7 carried to Appropriation Account.

Add: Balance at credit of Appropriation Account at 30th June, 1915	2,429 2 10
	<hr/>
	£35,144 19 5

Out of which there has been appropriated for Dividends Nos. 6 and 7 of 2½ per cent. and 5 per cent. respectively, declared during the year 32,368 10 0

leaving a credit balance to Appropriation Account at 30th June, 1916, of	£2,776 9 5
	<hr/>

WORKING CAPITAL.

The balance of Working Capital unexpended on Capital Account at 30th June, 1916, was £69,316 18 3 out of which there had at that date been expended on:

Livestock, vehicles, furniture and instruments	£38 18 0
Stores	15,964 6 9
Investments	9,674 13 5
Payments in advance	3,271 11 4
	<hr/>
	£29,291 9 6

leaving a balance of	£40,025 8 9
	<hr/>

CAPITAL EXPENDITURE.

The Capital Expenditure for the year amounted to £16,321 6s. 1d., made up as follows:—

Shaft sinking	48,580 11 8
Development through dyke in "E" Shaft area	1,532 14 0
Underground loading station	282 2 11
New staff quarters	658 7 5
Additions to ore reduction plant	359 10 0
Compressed air service	719 1 10
Electric generating plant	45 9 4
Extension of compound	293 0 10
Mealie mill and sample grinder	42 0 7
Electric signal system	173 6 3
New Change House, "E" Shaft	46 2 3
Oil and grease store	48 16 9
Underground pumping plant	642 9 9
Tube mill scoop and plate	45 9 11
Two detached cottages	153 9 0
Additions to refinery plant	102 8 6
Cooling pond and sprays	545 7 7
Fly screens for cottages	164 0 2
Trucks for dump haulage	148 11 4
Extension of boiler plant	1,590 14 6
Livestock and vehicles	44 0 0
Timber yard and shed	103 8 6
	<hr/>
	£16,321 6 1

The Sub Nigel, Limited.—continued.

INVESTMENTS.

The Company's investments and interests in other concerns, which stood in the books at 30th June, 1915, at £10,354 8s. 5d., now stands at £9,674 13s. 5d., a reduction of £679 15s., accounted for as follows:—

Dividend for the year ended 30th June, 1916, on the Company's holdings in The Knights Deep, Ltd., and Breyten Collieries, Ltd., which have been credited to Investments	£840 0 0
Less: Further Deposit of 2s. 6d. per unit paid to the Native Recruiting Corporation, Ltd., on 946 natives, and Deposit of 10s. per unit on 84 natives, being the number by which the complement has been increased during the year	160 5 0
	£679 15 0

DIRECTORS.

During the year under review Mr. J. Andrew Cohen was appointed a Director of the Company in the place of Mr. E. Turk, resigned. You will be asked to confirm this appointment and to elect two Directors in the places of Messrs. D. Christopherson and F. Leslie Brown, who retire by rotation, but being eligible, offer themselves for re-election.

AUDITORS.

It will be necessary to fix the remuneration in respect of the past year's audit, and to elect two Auditors in the places of Messrs. Douglas, Low & Co., and Roberts, Hays & Co., who retire in accordance with the provisions of the Articles of Association, but are eligible and offer themselves for re-election.

GENERAL.

Mr. F. G. Dunning has continued to act as your Company's Manager during the year, and your Directors wish to place on record their appreciation of the services rendered by that gentleman and his staff.

D. CHRISTOPHERSON (Chairman),
PAUL DREYFUS.
Directors.

THE CONSOLIDATED GOLD FIELDS OF S.A., LTD.,
Secretaries.

per A. C. GRANT.

Johannesburg, 15th September, 1916.

INCOME AND EXPENDITURE ACCOUNT for the Year ended 30th June, 1916.

Dr.	Cr.
To Mining Expenses	£68,517 3 3
,, Ore Sorting, Crushing and Transport Expenses	3,262 18 8
,, Milling Expenses	7,223 11 9
,, Tube Milling Expenses	5,036 19 7
,, Cyaniding Sand Expenses	7,154 16 8
,, Cyaniding Slime Expenses	4,454 16 5
,, General Mine Expenses	15,541 3 6
,, Mine Office Expenses	2,210 10 7
,, Head Office Expenses	4,271 19 8
,, London and Paris Office Expenses	1,334 0 2
,, Development	26,194 2 8
	145,252 2 11
,, Expenditure on renewals and replacements of machinery, plant, etc.	2,915 9 11
	£148,167 12 10
,, Balance Carried down	32,759 3 11
	£180,926 16 9
To Miners' Phthisis Compensation Fund	£820 14 8
Levies under Miners' Phthisis Act for the year ended 30th June, 1916.	
,, South African Income Tax — provision for year ended 30th June, 1916	£120 0 0
Less — Amount overprovided for year ended 30th June, 1915	11 13 5
,, Sundry amounts written off	108 6 7
,, Expenditure due to war	5 0 4
,, Gold Realisation Account—provision for additional charges on gold lodged prior to September, 1915, not yet realised	1,190 4 11
	556 11 11
,, Balance carried to Appropriation Account	£2,680 18 5
Note.—It is estimated that no profits tax is due and payable for the year ended 30th June, 1916.	32,715 16 7
	£35,396 15 0
	£180,926 16 9
By Balance brought down	£32,759 3 11
,, Interest, Commission and Ex- change	£2,439 3 7
,, Sundry Revenue	142 4 6
,, Transfer and Remove Fees	56 3 0
	£2,637 11 1
	£35,396 15 0

APPROPRIATION ACCOUNT.

Dr.	Cr.
To Dividend No. 6 (2½ per cent., December, 1915)	£10,789 10 0
,, Dividend No. 7 (5 per cent., June, 1916)	21,579 0 0
,, Balance carried to Balance Sheet	£32,368 10 0
	2,776 9 5
	£35,144 19 5
	£35,144 19 5
By balance at 30th June, 1915	£2,429 2 10
,, Balance from Income and Expenditure Account	32,715 16 7

The Sub Nigel, Limited.—continued.

BALANCE SHEET at 30th June, 1916.

Dr.	Cr.
To Capital Account	£431,580 0 0
475,000 Shares of £1 each	£475,000 0 0
Less 43,420 Shares of £1 each held in reserve	43,420 0 0
" Gold in reserve	8,000 0 0
" Sundry Creditors	33,715 12 5
" Open accounts, wages, stores and sundries	12,156 12 5
" Shareholders for Dividend No 7. declared June, 1916	21,579 0 0
" Dividends Unclaimed (per contra)	615 10 7
" Appropriation Account	2,776 9 5
Balance at 30th June, 1916.	<hr/> £4,603 0 9
 Contingent Liabilities—	
Balance payable on uncompleted contracts for Machinery, Plant, etc.	4,029 16 9
8s per Share unpaid on 158 Shares of £1 each of the Witwatersrand Native Labour Association, Ltd.	63 4 0
10s. per native on complement of 1,030 natives uncalled by the Native Recruiting Corporation, Limited	515 0 0
 and deposit of 10s. each on the total complement of 1,030 natives, being part of the total liability under agreement of £1 per native	<hr/> 515 0 0
 3,100 shares of £1 each in The Knights Deep, Limited, fully paid	2,483 2 6
3,000 shares of £1 each in the Breyten Collieries, Limited, fully paid	74 11 9
158 shares of £1 each in the Wit- watersrand Native Labour Association, Ltd., 12s. paid 7 shares of £1 each in the Native Recruiting Corporation, Ltd., fully paid	239 3 0
and deposit of 10s. each on the total complement of 1,030 natives, being part of the total liability under agreement of £1 per native	141 15 0
 Payments in advance	15,964 6 9
.. Sundry Debtors	9,674 13 5
.. Gold in transit	3,271 11 4
.. Cash at Bankers, London and Johannesburg	1,698 9 9
.. For Dividends unclaimed (per contra).	10,604 4 11
.. Cash	615 10 7
London, Johannesburg, Nigel and at Mine (including Cash on Fixed Deposit at Bankers).	72,214 15 11
 £476,687 12 5	<hr/> £476,687 12 5

THE CONSOLIDATED GOLD FIELDS OF SOUTH AFRICA
LIMITED,
Secretaries.
Per A. C. GRANT.

D. CHRISTOPHERSON (Chairman),
PAUL DREYFUS,
Directors.

To the Shareholders of
THE SUB NIGEL, LIMITED.

We report that we have examined the above Balance Sheet with the books and vouchers of the Company in Johannesburg, for the year ended 30th June, 1916, in which have been incorporated the audited accounts received from London, and the accounts received from the mine, and have obtained all the information and explanations we have required as Auditors. In our opinion such Balance Sheet is properly drawn up so as to exhibit a true and correct view of the state of the Company's affairs, according to the best of our information and the explanations given to us, and as shown by the books of the Company.

DOUGLAS, LOW AND CO
(Incorporated Accountants),

ROBERTS, HAYS AND CO.
(Chartered Accountants),

Johannesburg,
5th September, 1916

Auditors.

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**W. W. HOY,
General Manager.**

**Johannesburg,
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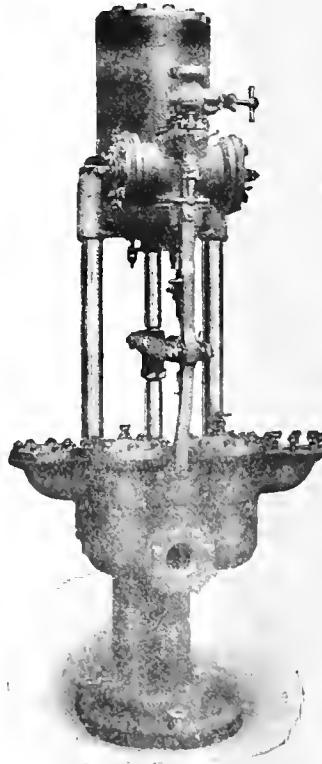
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